FRY'S PURE CONCENTRATED COCOA.

THE PRACTICAL TEACHER

With which is incorporated

The Practical Teacher's Art Monthly

May 1908

THOMAS NELSON & SONS LONDON
EDINBURGH·DUBLIN
& NEW YORK

VOL. XXVIII No. 11

PRICE 6D.

FROM BLACKWOODS' EDUCATIONAL LIST

CATALOGUES FORWARDED POST FREE ON APPLICATION.

THE BEST DICTIONARY.

STORMONTH'S ENGLISH DICTIONARY.

I. School and College Edition. Crown 8vo, 1,080 pp., 5s. net.
II. Handy School Edition. 16mo, 1s.

A NEW SERIES OF READERS.

Adopted by the London County Council Education Committee.

THE STORY OF THE WORLD. For the Children of the British Empire. In Five Books. By M. B. Synes, Author of "Stories from European History." With Coloured Frontispiece and numerous Illustrations by E. M. Synes, A.R.E., and Maps. Book I.—On the Shores of the Great Sea. 1s. 4d. Book II.—The Discovery of New Worlds. 1s. 6d. Book III.—The Awakening of Europe. 1s. 6d. Book IV.—The Struggle for Sea Power. 1s. 6d. Book V.—Growth of the British Empire. 2s. Prize Edition, 2 vols., 3s. 6d. net each.

Uniform with the above.

THE WORLD'S CHILDHOOD. In Two Books. Price 1s6d. each. These Two Readers consist of Fairy Stories and Simple Stories of the Gods and Heroes, and are fully Illustrated.

BLACKWOODS' LITERATURE READERS.

Edited by John Adams, M.A., B.Sc., F.C.P., Professor of Education in the University of London.

Book I.	For Standard IV.	228 pp.	Price 1s.
Book II.	For Standard V.	275 pp.	,, 1s. 4d.
Book III.	For Standard VI.	306 pp.	,, 1s. 6d.
Book IV.	For Standard VII.	361 pp.	,, 1s. 6d.

CÆSAR—GALLIC WAR, Books I.-III. By J. M. Hardwich, M.A., late Scholar of St. John's College, Cambridge, Assistant Master at Rugby. With or without Vocabulary. 1s. 6d.

CÆSAR—GALLIC WAR, Books IV., V. By St. J. B. Wynne-Willson, M.A., late Scholar of St. John's College, Cambridge. With or without Vocabulary, 1s. 6d. Vocabulary separately, 3d.

CÆSAR—GALLIC WAR, Books VI., VII. By C. A. A. Du Pontet, M.A., Assistant Master at Harrow. With or without Vocabulary, 1s. 6d.

OVID—METAMORPHOSES (Selections). By J. H. Vince, M.A. 1s. 6d.

HORACE—ODES, Books I., II. By J. Sargeaunt, M.A., late Scholar of University College, Oxford, Assistant Master at Westminster. 1s. 6d.

HOMER—ODYSSEY, Book VI. By E. E. Sykes, M.A., Fellow and Lecturer of St. John's College, Cambridge. 1s. 6d.

MACAULAY'S LIFE OF JOHNSON. By D. Nicol Smith, M.A. 1s. 6d.

A HISTORY OF ENGLISH LITERATURE. By J. Logie Robertson, M.A. 2s.

OUTLINES OF ENGLISH LITERATURE. By the same. 1s. 6d.

PARAPHRASING, ANALYSIS, AND CORRECTION OF SENTENCES. By D. M. J. James, M.A., Gordon School, Huntly. 1s. Also in Two Parts, 6d. each.

ELEMENTARY GRAMMAR AND COMPOSITION. 1s.

THE SCHOOL ANTHOLOGY. (Chaucer to the present day.) By J. H. Lobban, M.A. In Two Parts, 2s. each. One vol., 4s. Prize Edition, 6s.

THE TUTORIAL HANDBOOK OF FRENCH COMPOSITION. By Alfred Mercier, L.-ès-L., Lecturer on French Language and Literature in the University of St. Andrews. 3s. 6d.

ALL FRENCH VERBS IN TWELVE HOURS. By A. J. Wyatt, M.A. 1s.

A FIRST BOOK OF "FREE COMPOSITION" IN FRENCH. By J. Edmond Mansion, B.-ès-L., Royal Academical Institution, Belfast. 1s.

THE CHILDREN'S GUIDE TO THE FRENCH LANGUAGE. By Annie G. Ferrier. 1s.

A PRACTICAL GERMAN GRAMMAR, READER, AND WRITER. By Louis Lubovius, Ph.D. Part I.—Elementary, 2s. Part II. 3s. 6d.

A GERMAN READER FOR TECHNICAL SCHOOLS. By E. F. Sockler. 2s.

A SPANISH GRAMMAR. By William A. Kirkby. 3s. 6d.

FORTY ELEMENTARY LESSONS IN CHEMISTRY. By W. J. Sargant, M.A., Head Master, Oakham School. Illustrated. 1s. 6d.

HIGHER ARITHMETIC. 128 pp. Paper, 6d.; cloth, 9d. With Answers, cloth, 11d. Answers separately, 3d.

Full Educational Catalogue sent post free on application to

WILLIAM BLACKWOOD & SONS, 45 George Street, Edinburgh, and 37 Paternoster Row, London, E.C.

IMPORTANT ANNOUNCEMENT.

READY SHORTLY. GREATLY ENLARGED AND IMPROVED.

NELSON'S

1908] *ANNOTATED* [1908

SCOTCH CODE

THE *VADE MECUM* OF SCOTTISH EDUCATION.

Edited by JOHN KERR, M.A., LL.D.

Article 24 of the Code of Regulations for Day Schools just published contains, for the first time, the following obligatory paragraph:—"In every school receiving annual grants, the managers must provide out of the school funds—

(a) **The Code and other regulations for the year.**

(b) **All circulars and memoranda of the Department bearing upon methods of instruction, or relating to the management of the school."**

Nelson's Annotated Scotch Code has always satisfied (a), though hitherto it has not included the items mentioned in (b). In order to meet the new requirements, the issue of the Annotated Code for 1908 will contain everything which the Department prescribes in (a) and (b) of Article 24. It is needless to point out the obvious advantage of having the various documents in one compendious volume, well indexed and easy of reference. The only alternative is a loose collection of multifarious papers, liable to misplacement and continual confusion.

Owing to the increased size of the Annotated Code under the new conditions, and to the extensive arrangements that have been made in order to increase its utility, its price for the future will be 2s. 6d. net. The various documents comprised in the Annotated Code, if purchased separately, will be found to cost considerably more than this sum. The Annotated Code is being pushed forward with all speed, but this preliminary announcement is made in order that the readers of the *Practical Teacher* may solve the difficulty of Article 24 by simply ordering the new issue of Nelson's Annotated Scotch Code (1908). Orders should be given to Booksellers now.

Price 2s. 6d. net.

THOMAS NELSON & SONS, London, Edinburgh, Dublin, and New York.

THE PRACTICAL TEACHER

With which is incorporated

THE PRACTICAL TEACHER'S ART MONTHLY

Vol. XXVIII. No. 11. MAY, 1908. Price 6d.

Notices to Correspondents and Subscribers.

"THE PRACTICAL TEACHER" may be ordered of any Newsagent or Bookseller, or at any Bookstall, in the United Kingdom or in the Colonies. Supplies are sent monthly to the chief towns in Australasia, South Africa, and India.

LONDON OFFICE: 35 and 36 Paternoster Row.
EDINBURGH OFFICE: Parkside Works.
DUBLIN OFFICE: 17 Talbot Street.
NEW YORK OFFICE: 37 East 18th Street.
PARIS: W. H. Smith and Son, 248 Rue de Rivoli.

Subscribers may obtain "THE PRACTICAL TEACHER," post free, from the Publishers at the following terms:—

United Kingdom, Continent, Colonies, and United States } 12 Months, 8/- 6 Months, 4/-

All literary communications should be addressed to the Editor, Office of "THE PRACTICAL TEACHER," 35 and 36 Paternoster Row, London, E.C.

Remittances, Cheques, Post-Office Orders, etc., should be made payable to THOMAS NELSON AND SONS. Advertisement rates on application.

CONTENTS.

Educational Opinion. By VERAX . . . 562

Moral Instruction in Practice. A Visit to Long Lane Council School, East Finchley . 564

Nature Notes for the Month.—May. By W. FRANCIS RANKINE 566

Education in Parliament 569

Geography Notes Up-to-date. By E. R. WETHEY, M.A., F.R.G.S.—Trans-Continental Routes of South America—The Decline of Hops in England—The Commercial Geography of the Hop—Farewell the Rocky Mountains! 570

Common-sense Hints on the Teaching of Arithmetic. By an INSPECTOR OF SCHOOLS 573

A Submarine Sponge Gatherer. With Blackboard Drawings by H. WILKINSON . 575

Our Art Section—
- Youths and Maidens in Art. By HAROLD ARMITAGE 577
- The Past and Future of Educational Handwork. Address by Dr. KIMMINS 579
- Art Section "Honours Page." An Interesting Competition 580
- Practical Drawing Lessons. Class III. . . . 582
- Board of Education—Examination in Freehand—IV. 586
- Flower Studies from Nature 588
- Cardboard Modelling for Juniors. By FELIX T. KINGSTON 589
- Studies of Butterflies 591
- The Teaching of Drawing in Secondary Schools . 592

The New English Movement. Hints from America. By W. H. WINCH, M.A. . . 593

The Teaching of History 594

Our Query Column—
- Replies to J. B. H.—Blackburn—Student—A. P.—W. H. Edge—François 595

Papers for Teachers of Infants—
- "If." Words from "Songs of the Nursery." Music by THOS. J. HEWITT 597
- Letters as a Preparation for Reading. By CLARA E. GRANT 598
- The Story of the River. A Scheme of Connected Lessons for Standard I. By E. MOSA CLAY and R. M. M. ATKINSON.—I. Riverside Vegetation—II. Common Birds—III. The Swallow—IV. Bees 599

Our Prize Competitions—
- French Competition 603
- Composition Competition 603

Notes from the North. By ROBERT DICKSON, M.A. 604

Dictées Françaises. The chief Difficulties and Anomalies of French Pronunciation Systematised and Illustrated. By GEORGE H. KNIGHT, L.C.P. 606

The Picture Post Card in the School . 607

Obituary—
- Mr. C. E. Neville, B.A. 608
- Mr. W. H. Thomas, B.Sc. 609

The Editor's Bookshelf—
- New Publications for the Teacher and Student of French—Holidays at Home—The Study of Words—A Welcome Re-Issue—Two Indispensable Handbooks—Minor Notices . . 610

Our Students' Column—
- The Student-Teacher and School Practice. By W. MACPHERSON, M.A. 612
- Help for Certificate Students. By GEORGE COLLAR, B.A., B.Sc. 614

Our Science Section—
- Physiography (Stages 2 and 3). By C. A. WEST, B.Sc., A.R.C.Sc., F.I.C. 616
- Mathematics (Stages 2 and 3). By FRANK CASTLE, M.I.M.E. 617

Educational Opinion.

THE RIGHT HON. WALTER RUNCIMAN,
PRESIDENT OF THE BOARD OF EDUCATION.
(*Photo by Elliott and Fry.*)

MR. REGINALD M'KENNA, who came to bring "not peace but a sword" into the educational world, has gone to preside over the destinies of "the man behind the gun," and will probably live to regard his sojourn at the Education Office as the greatest Gilbertian joke of his political career. Mr. Walter Runciman has been appointed President of the Board of Education, perhaps because he knows such a great deal about ships, and the educational barque is about to

Our New Chief.

"Weather the roughest storm
That ever wind can blow."

It is our duty to find reasons for Cabinet appointments in connection with education, and we consider that the above does us some amount of credit. Meanwhile the inside work of the schools goes happily on.

THE year of grace 1908 will surely be known to future generations as the year of Congresses *par excellence*. First and foremost is the International Congress on the Teaching of Drawing, already mentioned in these notes, which bids fair to be a completely representative meeting, from which much good ought to accrue. It may not be generally known that in connection with this Congress there will be a display of representative exhibits of drawing, among which will be found one drawn from all types of schools and colleges under the London County Council. The great Franco-British Exhibition, with its large Educational Section, promises to become a sort of monster Congress. In September London will offer hospitality to the first International Moral Education Congress, whose preliminary sheet of announcements is sufficiently extensive and alluring, and whose list of officials and adherents is appallingly polyglot. And in October Paris will be the scene of the labours of another Congress, the second International Congress on Popular Education, with a vast agenda of work. This particular gathering is under the ægis of the *Ligue Française de l'Enseignement*, whose headquarters are at 16 Rue de Miromesnil, Paris. Intending congressists should apply there for information. English-speaking teachers need have no fear. We notice among the secretaries the name of M. Baudrillart, of whose admirable command of English we have had ample experience.

A Year of Congresses.

HOLIDAY Courses are in the air. Time was when going abroad to join a holiday course was like taking a leap into the unknown; now, the only difficulty is to know how to choose aright among the multitude of courses open to studious holiday-makers, or holiday-making students, whichever be the correct designation. Among the items of information relating to holiday grants given to teachers of foreign languages by the London County Council, the *London County Council Gazette* gives a most useful list of holiday courses at which these grants may be utilised. Though it does not exhaust all the list of opportunities offered, it is yet astonishingly long and varied, and will be useful for reference by the general teaching public. Five of the courses are in Germany, three in Switzerland, one in Spain, and one in Italy, while there are no fewer than eighteen courses in various parts of France. Quite apart from the value of the courses of study announced, many of the local committees add the most alluring inducements.

Holiday Work—

BESANÇON offers its medicinal springs, so that the holiday-maker can at the same time improve his French and his health. Dijon has historical and artistic treasures waiting to be explored. St. Servan and St. Malo will send their students to the glorious Mont St. Michel and its bay; Bayeux has its unique tapestry—an inducement almost sufficient to turn one into a "holiday courser" at once; Florence, an ideal home for the student with artistic bent, a museum in itself, offers still further delights at Fiesole, Siena, and Ravenna; and Grenoble has the most delectable list of attractions possible to imagine—Dauphiné and Savoie to explore, La Grande Chartreuse, Mont Blanc, and La Meije at one's door, so to speak, and—crowning delight—open-air performances of French classical tragedy in the Roman Theatre of Orange. It is now some years since we saw it, but we can imagine ourselves packing our bag with a rush for holidays and work at Grenoble.

And Play.

THE English teacher, relying on the expert knowledge of officials and the common sense of requisition committees, can usually be confident of securing a supply of school books good in quality and suitable for his or her own needs. At any rate, he knows nothing of school books chosen by people who have no acquaintance with matters educational, and who, in many cases, being politicians pure and simple, are influenced by a political "pull" on the part of publishers anxious to secure a contract. Politics is the predominating influence in all American municipal matters, entering into educational affairs to an extent unheard of at home in England. Educational grants—or "appropriations," as they are called—administration, appointments, furniture, even school books, all feel the pernicious influence of the politician *pur sang*. In some parts a State committee chooses the books for use throughout the schools of the State; in fewer cases the local authorities, acting through a committee, perform this service. In this latter case the needs of the schools have some chance of being considered; in the former, so avers the *Journal of Education*, none whatever. This periodical has opened a campaign on behalf of the teachers and pupils of American schools, and some of the facts it adduces are, to say the least, interesting.

Politics and Text-Books.

❧ ❧ ❧

IN one State the Board of Education consists of the governor, lieutenant-governor, secretary of state, treasurer, auditor, and superintendent of public instruction—all, be it noted, politicians, save the last. The conditions of American politics make it possible for the selector of school books to be quite uneducated. In another State one of the officials, twice charged with the selection of school material for a great State, had not been in school since he was twelve years old! It is quite possible he may have been a worthy man, educated by life itself, but on the face of it the choice was not reassuring. A laughable instance was the choice, by one of these boards, of readers glorifying the mountain ranges, glorious forests, etc., of the State, which does not possess a hill 100 feet high nor a forest of any kind! In another case a geography, prepared *ad hoc*, was selected through political influence, and this book proved too bad for use, its map of the State having omitted a whole county! There is much force in the contention of our American contemporary that only those who are constantly using or examining school books can estimate their merits, and that the average politician, who has not handled a school book or entered a school for twenty years, is the last person to be entrusted with the selection of material on which school work largely depends.

Quaint Anomalies.

❧ ❧ ❧

STUDENTS in training colleges are just now passing through an anxious time, for select lists for future appointments are being made by Local Authorities, and on this choice the immediate future of numbers of young students depends. Rumour has it that in London last year's "College List" is by no means exhausted, that many well-qualified teachers are still awaiting permanent appointment, and that the size of the 1908 list has been cut down considerably. Which, being interpreted, means that a corresponding number of students admitted into London County Council training colleges in order to enter the service of the London County Council will find themselves discarded. There is likely to be hardship in this, and the question of the allocation of students wants settling without further delay. We ourselves strongly oppose the idea of "parochial" training—that is, forming a service of teachers who have been born, bred, taught, and trained in one locality for the service of that locality. The idea is radically bad. But seeing that Local Authorities everywhere are instituting their own training colleges, there is in London only one way out of the dilemma—either by making the select list for London students only, and thus frankly adopting the "parochial" idea, or by abolishing the "College List" completely, and throwing all appointments open to general competition.

College Lists.

❧ ❧ ❧

AN oddity in spelling is given by the last American *Journal of Education* in the following list of ways of writing "Chicago," vouched for by the postmaster of that city. Of course the polyglot nature of the population accounts for many of the forms, but the list is interesting as showing the constitutional difficulty which many experience in reproducing a name correctly. We remember the lady who wrote, "I have *persued* spelling for thirty years, but am unable to attain it," and the *persuers* of Chicago may well sympathise with her complaint. Here is the "Chicago" as it is wrote: "Chiccago, Checago, Chicawgo, Chikkago, Chiggaggo, Chiggego, Cheegago, Chirgago, Shechago, Shikkago, Shercaggo, Shakakko, Schuerkaigo, Psceschago, Stkschga, Tschakko, Tzstchago, Stktschagko, Schenkakko, Zheckako, Stschaggo."

Where Spelling is Difficult.

❧ ❧ ❧

HOW many teachers would be brave enough to imitate the Baltimore teacher of a third-grade class—that is, of eight-year-olds—who has instituted a "pets' visiting day" in connection with her nature-study lessons? To this reception the youngsters bring their animal pets, and among them figure pigeons, chickens, white rats, kittens, dogs, rabbits, a parrot, and a carrier pigeon. But a goat whose reputation was bad had to be barred as an undesirable visitor. What a chance for the boy whose inclinations lead him towards natural history, whose pockets are the despair of his maternal parent! At last he will be understood, and be able to exhibit proudly worms, newts, frogs, blind-worms, and mice without causing convulsions among his audience. The Baltimore pets, with the one exception of the goat, appear to have been quite respectable, but a certain amount of courage would seem to be necessary in adopting the innovation.

"At Home" to Pets.

❧ ❧ ❧

THE lamentable fire near Cleveland, Ohio, has had swift effects. Several hundreds of schools in America have been closed for some time, because examination proved that they were unsafe in case of fire breaking out. And throughout London officials have been examining classroom doors, staircases, and exits to school buildings, to see whether they would facilitate or hinder free exit in case of an outbreak. The poor little American victims will not have died in vain if their sufferings make a repetition of the disaster impossible.

Out of Evil —Good!

MORAL INSTRUCTION IN PRACTICE.

IT is the prevalent idea that there can be no satisfactory position between definite doctrinal teaching and complete secularism, and that where an attempt has been made to give religious instruction that is not doctrinal in character it has degenerated into the mere study of the Bible from a historical or a literary point of view. In view of the importance of this matter, the *Practical Teacher* obtained permission for its representative to visit Long Lane Council School, East Finchley, the headmaster of which, Mr. A. T. Fowell, has devoted much time and thought to the preparation and carrying out of his scheme of moral instruction.

The school is built to accommodate 720 scholars, and is at present almost full; and although, compared with the palatial edifices found in some of our towns, the building does not at first sight impress one, a closer acquaintance shows that although plain it is substantially built and admirably planned. The classrooms are airy and well lighted, and, seated at his desk on a platform at one end of a commodious hall,

MR. A. T. FOWELL.

the headmaster has the whole of the fifteen classrooms ranged round the three sides under his direct supervision. At the bottom of the playground are centres for instruction in cookery, housewifery, and manual training, all well equipped with everything necessary for efficient work; but here again, as with the building itself, there is no attempt at mere show.

Although moral instruction was the chief object of our visit, it would be a grave injustice to Mr. Fowell were we to pass over the rest of the work and allow our readers to imagine that he is a man of only one idea, or that at the end of the period controlled by the "conscience clause" the work of the school becomes commonplace or colourless. On the contrary, there are three points that particularly impressed us as marking the individuality of the school: first, the completeness of the organization; secondly, the intimate knowledge Mr. Fowell has of the capabilities and characteristics of each individual scholar; and, thirdly, the high moral tone which pervades the whole of the school work. Of the first of these points we can only say that every detail of the work, from the distribution of the library books to the provision for the safety of the children in the event of fire, has been carefully planned to secure smooth and efficient working.

But admirably as Mr. Fowell handles his school as a whole, his knowledge of each individual scholar is even more remarkable, every scholar being provided with a card on which is entered a yearly report of the child's physical, mental, and moral development. To do this conscientiously for seven hundred children entails an immense amount of work and attention; but Mr. Fowell is a believer in the Froebelian motto, "Let us live for our children," and nothing is too much trouble for him if it will benefit the little ones. "I believe," he says, "that every child possesses some particular talent, and a master is not doing his duty by the child if he fails to discover and develop that talent." Everything, therefore, is done to ascertain the tastes and inclinations of the scholars, and to encourage any individuality that the child may show in the direction of literary, artistic, or manual work. The matter does not, however, stop here, for the Council carry the scheme out to a logical conclusion, and endeavour, by means of a well-organised labour bureau, to place the children they have educated in the callings for which they are best fitted.

Coming to the subject of moral instruction, we may say at the outset that the scheme at Long Lane School is based upon the religious syllabus drawn up for the Finchley Education Committee by their secretary and educational adviser, Mr. Alder; but it must not be imagined that the moral instruction is confined to the first half-hour of the day. "The fundamental idea underlying all moral instruction," says Mr. Fowell, "is the formation of character and the establishment of a code and standard of conduct through life. It is ridiculous to imagine that this can be effected during one half-hour of the day. Teachers who are busy making men or women find material for building up character and moral fibre in all lessons. In particular this applies to history (the syllabus for this school distinctly states that in the lower standards history is to be taught more with the idea of forming character than of teaching history), but even the arithmetic lesson yields warnings against cheating and shirking, and provides incentives towards pluck, grit, carefulness, etc." The religious syllabus of the Council is well worthy of careful study, and we regret that space forbids us giving it in full. It apportions the week's work as follows:—

Monday.—Bible lesson (Old Testament).
Tuesday.—Bible lesson (New Testament).
Wednesday.—Repetition of Scripture.
Thursday.—Moral lessons.
Friday.—Oral and written composition on the foregoing, or lesson in the hall by the headmaster on character building.

It also lays down that each Bible lesson should consist of—

(*a*) A definite subject to concentrate ideas.

(*b*) A Scripture passage to be read in illustration as indicated.

(*c*) An anecdote (preferably from school life) to give the lesson a living and personal application.

(*d*) Illustrative texts to be supplied by the children, who should be told the subject of the lesson beforehand.

"This," says Mr. Fowell, "explodes the idea that moral instruction is irreligious. I grant the possibility of laying down a system of morals or ethics of non-religious cast for the adult mind, but such an idea is absurd for children by reason of its abstract character. For the child-mind moral instruction must be concrete and real, and be based upon foundations with which

the young are familiar. Hence all the moral instruction lessons in my school are based upon (*a*) the Golden Rule, (*b*) the Sermon on the Mount, (*c*) the lessons of the parables, (*d*) the lessons learned by studying the characters of men whose life-histories are found portrayed in the Bible."

Of the success of the teaching there is not the slightest doubt, and this success is due to three things :—

1. All lessons are prepared with the same care and thought as oral lessons in secular subjects.

2. All lessons are graduated from standard to standard to suit the ages and capabilities of the scholars, whilst continuity is not sacrificed.

3. All lessons are prepared with the main idea of character formation, and are so treated as to afford living and personal application to the scholars.

Of the thoroughness of the preparation the teachers' note-books leave no doubt. We were particularly anxious to see the notes of a lesson on self-reliance, an account of which had appeared in the columns of a daily paper; for the impression left on our mind by that account was that the lesson had received very scanty preparation, and that the teacher was padding it out with a story. Should any of our readers have seen the paragraph in question and formed the same opinion, we can assure them that the lesson had been well prepared, the notes being planned and thought out with an amount of care that we have seldom seen equalled.

Of the graduation of the lessons we may say that the course expands naturally from personal duties to family duties, civic duties, and, finally, to ideals; and we think it must be admitted by those who recognise that the real business of teachers is "to make men and women" that such a course is admirably adapted to the purpose.

But the crowning-point of the whole scheme is the personal application, for no moral instruction can be of any value unless it influences the lives and actions of the children. At Long Lane there is abundant evidence that the earnest efforts of the teachers are bringing forth good fruit, but we must make one or two instances suffice. Take, for example, the very lesson we have just been discussing, on self-reliance. The practical outcome of this is seen in the many matters that the children manage for themselves—such as their clubs, the collection and distribution of the library books, and even the editing and management of a manuscript school magazine. This interesting little book of some forty pages appears monthly, and is entirely the work of the children in Standard VII. A lad with strongly marked journalistic abilities (for whom, by-the-bye, a place has already been promised in a newspaper office) edits it with skill and ability, the question of the selection of suitable material being left completely in his hands without any supervision whatever from the teachers; and although the contributors are not all literary geniuses, the magazine does not compare unfavourably with many public school magazines, every page being marked by good taste, common sense, and, at times, flashes of real humour.

In the Gymnasium, Long Lane Council School.

Again, a keen appreciation of honour is shown by the steady way the children continue their work when the teacher's attention is called away; while charity and brotherly love are shown in many practical forms. We were shown a room, some twelve feet square, containing a large number of articles of clothing brought by the better-class children for the benefit of their poorer school-fellows. Three times a week, too, cheap dinners are provided for the poorer children, the whole of the preparation, distribution, and washing-up being carried out voluntarily by the older girls under the supervision of some of the teachers, who, knowing the value of example in moral training, are quite as willing as the girls to sacrifice their leisure time for the purpose of helping their fellows in distress.

Thrift is encouraged by means of a penny bank and

GIRL PUPILS, LONG LANE COUNCIL SCHOOL.

a book club, in which the children are enabled to save their pence instead of wasting them on trashy or ephemeral literature; and when they have accumulated the price of a good book, they are able to purchase something worth having and keeping. This cultivation of a love of good literature plays an important part in the practical side of the moral training. Each class has its own library, under the care of its own curator, the books being selected to suit the ages of the readers; but in all cases we were struck by the high literary standard adopted in the selection.

But good literature is not the only refining influence at work. Mr. Fowell agrees with St. Paul in making "whatsoever things are lovely" go hand in hand with "whatsoever things are honest, whatsoever things are just, whatsoever things are pure," and believes in surrounding the children with beautiful pictures and familiarising them with the best of music; for, in addition to the ordinary school music, he has a school choir of picked voices for the performance of high-class part-songs and choruses, as well as a strong band of fifty performers which includes the works of Mendelssohn, Handel, and Gounod in its *repertoire*.

Space will not allow us to do more than mention the "Old Boys' Club," of some 150 strong, which holds a social meeting every Thursday night in the hall of the school. This is presided over with untiring devotion by Mr. Fowell, assisted by his lady teachers, who kindly undertake the preparation of the refreshments; and once a month lantern lectures are given. In addition to the social side there are also clubs for cricket, football, cycling, harriers, and swimming—the latter being particularly successful owing to the interest taken in it by Mr. M'Master, who is a great enthusiast in the work.

Thus we take leave of Long Lane School and its carefully arranged scheme of moral instruction. To many people the name suggests secularism or even atheism; but we hold that the example before us shows quite the contrary, since the instruction is founded on the Bible, developed along the lines laid down by St. Paul as being worthy of careful thought, and fully satisfies the definition of true education given by the Bishop of Salisbury—namely, "the intelligent formation of character, so that the child shall learn to be his best self in every part of his nature."

NATURE NOTES FOR THE MONTH—MAY.

BY W. FRANCIS RANKINE.

Illustrated from Nature Photographs by Aileen Sherlock.

> "Then came fair May, the fairest mayd on ground,
> Decked all with dainties of her season's pride,
> And throwing flowers out of her lap around."
>
> SPENSER.

MAY, by the prophecy of the calendar, is the month of blossom, of sunny skies, and warming breezes. This is the mask beneath which is the face of treachery, for it is often the month of belated blossom, overcast sky, and chilling winds. It is the month variant of the year, and it wearies the soul that has impatiently awaited the full glory of springtide. There are days that gladden us, and skies that smile on a flower-decked earth; yet there are nights of frost that canker the heart of the bursting bud and retard the sprouting leaves of plants. These frosts are aided in their injurious influence on plant growth by the heat of the May sun.

Let us picture May in her glory as the "fairest mayd on ground," and forget the unkindness of fickle wind and cloud in the wealth of the spring glory she often brings. A verdant colouring has crept over wood and coppice and hedgerow, and the later blossoms of spring add their welcome tints to the picture. The bursting green leaves of the hawthorn are lost in a snowy mass of blossom; the fruit orchards possess a wealth of flower that arrests the eye; the woodland glades are beautiful with the deep blue of the wild hya-

cinth, the yellow of cowslip, and the delicate white of the nodding anemone, so aptly called the wind-flower.

Along the lanes are masses of glossy white stitch-wort blossoms and the turquoise blue speedwell. This is Nature's own garden, that in glory and colouring and massing outrivals the compositions of man. There are insects, too, and on the kindest days there are many of our butterflies to be seen. The white butterflies—large white, small white, and green-veined white—are there; the common blue, holly blue, and small copper are on the wing; and in the sanctity of the woods the rarer species are to be seen. Among these the pearl-bordered fritillary is the most beautiful, and the wood white the daintiest. At this time the humming-bird hawk-moth, a day-flying species, is noticed; it is a beautiful insect, and endowed with highly-developed powers of flight. Often it may be observed in gardens, poised on rapidly-vibrating wings, feasting on the nectar of verbena or delphinium: this is the time to net it—if you can. That gorgeous moth, well named the emperor, emerges this month; but although it is widely distributed, it is not always in evidence. On the bark of willow or alder the puss moth may be found; while the peppered moth is not at all a rarity. Twilight calls forth numbers of the brimstone moth for their evening flight along the hawthorn hedges; and again in August, when the second brood emerges, these dainty sulphur-tinted insects may be seen.

In bird life the business of the year is well advanced; the dying away of day is the signal for the burst of the bird chorus. From tree to tree, bush to bush resound the answering chords of a happier world than ours; it is an appropriate setting to the sundown of the day—a song of thankfulness, and of hope for the morrow. Then, when the bird-world has settled to its rest, the nightingale sends forth its beauteous melody of trills and rippling cadences into the night.

Observations and the Nature Lesson.

The importance of observation in the Nature Lesson is widely admitted; it is rarely taken advantage of to its fullest extent. It is an element in education that often suffers in intent through an imperfect conception of its extent. This is regrettable, since observation is the most powerful factor in the possibilities of the Nature Lesson. The chief difficulty lies in the initial selection of material and the establishment of integral thought in the study of this material; completeness of perspective in observation is the conditioning factor of success. Mental constructions of any real value are not founded on sense experiences obtained at random; there must essentially be logical arrangement in these, and when such conditions are secured the highest value of observation is realized. Promiscuous observations are valueless and lead to waste of time. Many examples of such observations are easily found—often too frequently—in year records. Here is a selection. "I saw a crow sucking eggs." "I found a maggot in an apple." "I found a nest containing four eggs." Thousands of observations such as these will not advance the recorder many steps along the path to discovery; observation, to be educationally valuable, must be continuous. Its continuity must be founded on complete perspective of idea. On the other hand, natural phenomena, the material for observation, is so complex and overlapping that much forethought is necessary in the selection of a suitable sequence of material.

It is interesting to note how imperfectly the power of observing is developed in the average person—to such an extent that very few can describe faithfully any phenomena somewhat outside the everyday, commonplace experience. This imperfection is remarkably well shown in the observation of birds or insects that are unfamiliar to the observer. The form may be correctly recorded, but colouring is rarely described faithfully. These remarks refer, of course, to untrained observers—comparatively few are trained—yet they serve to emphasise the fact that observation in the average person is imperfectly developed. It may be an accident of developed civilisation by which we are gradually rendered independent of this faculty. It is remarkable to what an extent observational powers are developed in the uncivilised savage. It is not to be wondered at, for the mere existence of these races is a function of observation.

Another interesting phase of untrained observation is its tendency to exaggeration and untruthfulness. Of this we often obtain examples in the records of youthful naturalists, who misrepresent size and form. Undoubtedly, this is explained by a bias due to mental constructions previously assimilated from pictures and hearsay reports—and also to a certain element of carelessness.

In Nature work it is of the highest importance that observation should be trained, complete, and truthful. Such conditions are secured in continuity of observation, and continuity depends on judicious selection of phenomena. In the lower classes, where formal Nature Study Lessons are not given, the subject is of a comparative nature; external forms and appearances are compared, contrasted, and noted from many points of view. This secures the conditions that ensure success in the more detailed observation which is carried on in the higher classes. Then follow observational lessons. For these there is no better material than the examples of changing Nature that are so easily obtainable; they are valuable, not only in virtue of their marked stages of changes, but also on account of their wide distribution and commonplace occurrence. Further, the observation is primary, and so there is no loss through the employment of pictorial representation, which is secondary observation.

Probably the most interesting subject for continuous study is that of bud development. In this issue we present a series of photographic records of the development of the horse-chestnut from its budding to its fruition. Here is material worthy of the most detailed observation, and at the same time it is available almost everywhere.

Stages in the Development of the Horse-Chestnut.

Observations of this kind are usually confined to the bursting of the buds in spring, for at this period of the year such changes are very noticeable. There is, however, scope for a year's work in this direction. The chief stages are:—

1. The bud in its winter state. Bud scales—their structure and arrangement. Resinous secretion.

2. Bursting of the bud—namely, the opening of the scales. Melting of the resinous substance. Expansive force of the developing bud.

3. Appearance of the flower-buds. Downy hairs as a protective covering.

4. Development of leaves. Raising of leaves. Lengthening of flower-stalks.

First Stage.

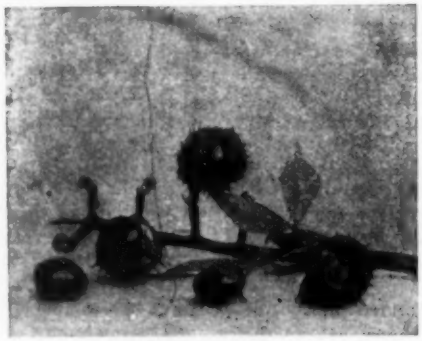
Second Stage.

Third Stage.

Fifth Stage.

Fourth Stage.

Sixth Stage.



Seventh Stage.

Horse-Chestnut—Seven Stages. (From Copyright Photographs by Aileen Sherlock.)

5. Appearance of flower. Its colour, structure, and arrangement. Fertilisation.

6. Development of fruit. Appearance, and protective prickles.

7. Ripening of fruit. Opening of valves and fall of fruit.

In addition to these stages there are intermediary phases which may be recorded—namely, 4 (*a*) the fall of the bud scales, and 6 (*a*) leaf fall.

From March to October the horse-chestnut, a familiar tree in all parts of our islands, affords material for continuous observation. Early in winter the terminal buds are noticeable on account of their large size, symmetrical form, and dark colour. Through the winter they gradually increase in size; and in February the gummy scales, in exuding sticky matter, prevent a lowering of temperature within the bud, and also a loss of moisture when the drying east winds of February and March are blowing. At this stage a bud should be cut, so that a transverse section may be studied; it will be found that the flowers and leaves are neatly packed in a covering of white downy substance. The function of this down is obvious, and a study of such a section emphasises the wonderful completeness of Nature's embryos.

The warmth of the early spring sun promotes further development in the bud, and the expansive pressure of growth causes the bud scales to open gradually, and thus allow the leaves to appear. The bursting of the bud is a decided stage in development. It is helped by the softening of the gummy secretion on the bud scales. At this stage it is noticed that the consequent development is greatly influenced by weather, for the tender bud leaves are very susceptible to the slightest unkindness of the cold winds. As a guard against such retarding influences the leaves are covered with soft downy hairs, which entirely disappear at a later stage.

During April the leaves develop; the curious claw-like leaves droop with points downwards, and the leaf-stalks are very short. Gradually the down-covered flower-buds appear. A notable development at this stage is the raising of the leaves and the lengthening of the flower-stalks. The leaf-blades broaden, and soon the characteristic form and attitude of the leaf give the tree that majestic appearance that makes it an ornament of landscape.

By now the sticky bud scales have completed their mission, and gradually drop, one by one, from the stems. This scale-fall often passes unobserved, yet it is interesting and important.

Just as the horse-chestnut is distinctive in foliage, so it is in blossom; no other tree approaches it in beauty when the gigantic, white flowering spikes are at their best. There is a harvest of honey for the bees, whose buzzing and humming is a familiar sound on hot sunny days. However, this floral beauty is short-lived, and soon the red-centred, white flowers fall and carpet the ground below.

It is worthy of note that comparatively few flowers are fertilised; this observation may be verified when the prickly fruit cases appear. Soon the leaves begin to lose their verdure; in fact, the horse-chestnut is one of the earliest to assume the gorgeous tints of leaf change. Its yellow autumn colouring, gradually turning to brown, contrasts pleasantly with the glowing reds and browns of the trees in September and October.

In October the fruit is ripened and the valvular cases open, so that the glossy brown fruit falls on the leaf carpet below. This stage of development never escapes the notice of the British schoolboy, who carefully collects the ripened chestnuts for playground occupations. The fall of the leaf progresses, and soon the cycle of the year's development is completed. Yet there is no resting, for the new cycle has commenced, and already the characteristic winter buds, brown and scaly, are peeping out.

Such, then, is the history of a well-known forest tree. A similar range of observations may be carried out with the oak, beech, sycamore, etc., as subjects. The results will be equally interesting and equally instructive.

EDUCATION IN PARLIAMENT.

THE "Unholy Alliance" has broken down; Roman Catholics, Anglicans, and Free Churchmen no longer agree together sweetly about "contracting-out:" which is "tidings of comfort and joy." The best Parliamentary news of the month is that the "contracting-out" clauses of the Government Education Bill are on their last legs and at their last gasp. The Government know now that they cannot "contract-out" of their educational duty by means of "contracting-out." Again, and not for the second or third time in the long series of Bills on education during the past dozen years, it has been shown that the teachers, in Parliament and out of it, possessed a sounder educational feeling, and also an abler political prescience, than did the various parties and high and mighty political bodies which schemed for Bills and engineered proposals. At once and from the first the teachers denounced "contracting-out." Dr. Macnamara and Mr. Yoxall did it in 1906; Mr. Yoxall did it again this year; and they foretold the failure of the proposal.

Political prescience consists in knowledge of the situation, right estimation of the chances, and accurate weighing of the relative specific gravities of opposing forces, static or dynamic. The teachers saw that the static force in this case outclassed the dynamic, and that crude "contracting-out" could not be brought about. Yet Mr. M'Kenna, and even Mr. Asquith, believed a month ago that by allowing "contracting-out" and four or five shillings a child more in grant, they could buy off ecclesiastical opposition to the rest of the Bill. Archbishop Bourne, too, misread the signs of the times; Archbishop Davidson forgot the existence of the National Society; and Dr. Clifford—an eloquent voice, but no counsellor—supposed that Nonconformists would agree to the debasement of the schools. But once more the teachers' prophecy has been verified; for the time being, at any rate, "contracting-out" is dead.

Scylla and Charybdis! No sooner has "contracting-out" ceased to be a live danger than "right of entry," rocky "right of entry," looms out on the other side of the strait. Instead of going ahead with the Scottish Education Bill (puny little measure though it be), Parliament immediately proceeds to concern itself with a Bill that hails from North Wales. The Bishop of St. Asaph has introduced a Bill to promote Pan-denominationalism and pandemonium in every school, which

representatives of the sects may actually enter, and full liberty to give denominational lessons by the teachers on the staff of any school. Council schools, as well as Voluntary schools, mind you! Not merely "right of entry" on behalf of a denomination into schools which up to the change have belonged to that denomination; "right of entry" all round. The priest, the curate, and the rabbi to enter the Council school; the Orangeman to enter the Roman Catholic school; and the Plymouth Brother to enter the High Anglican schools of Devon, each with a different set of religious doctrines. And then, when they have so entered the schools, and endeavoured to manage the classes decently, and failed, then the children are still to be kept in the same theological pens and divers enclosures, hurdled off in groups *ad hoc*, when the amateur pastors and masters have tired of the unpaid work, the worry, and the failure, and retired; so that the regular teachers of the school may then have full opportunity to "volunteer" to do this *soi-disant* religious work, acting as freely in the matter as did the landsmen whom the press-gang sent summarily to sea a century ago. Upon this proposal a buzzing House of Commons and a chattering daily Press have gone to work with loud cries of "Here's a chance for peace! Here are the elements of a compromise at last!"

Mr. M'Kenna, perceiving that his own Bill could not get through, contemplates with pleasure the appearance of what may seem to be an honourable alternative; and many good people, honestly enough, no matter how ill-informedly, sincerely believe that here at last are the elements of peace. Peace might come now if there were and had been no "passive resisters"—if the Churches cared more for Christianity than for the canon; if their combination on behalf of the Licensing Bill against a real evil could extend to that field in which they have so long waged a sterile and bigoted war. But they will not do that except upon a bargain; and the bargain may be struck over the heads of the teachers and against the welfare of the schools. A bargain on "right of entry" might be less harmful to the schools than a bargain on "contracting-out;" but a bargain on "right of entry" pure and simple is not likely to come about. The Bishop's Bill will not pass, any more than will Mr. M'Kenna's. What may pass, however, is a Bill combining the features of both. Perhaps Mr. Runciman may see it through.

And here comes in the new danger. Suppose that to the authorities and devotees of denominational schools the following terms were offered:—(1) "Right of entry" into all denominational schools transferred to the Local Educational Authority, and into all other Council schools, *plus* (2) "contracting-out" for denominational schools not so transferred. The assumption would be that most denominational schools would be transferred, and right of entry into Council schools would be the price which supporters and devotees of Cowper-Temple schools would pay for that. But there could be no guarantee that most denominational schools *would* be transferred, and it might well happen that, in the event, "right of entry" into Council schools would co-exist with "contracted-out" schools going on denominationally by the thousand. Unless the Government and the Nonconformists take care, they may find themselves hoist by the petard they are playing with. A bargain based on both "right of entry" *and* "contracting-out" is really too dangerous for words. The Jews and the Roman Catholics and a good number of the High Anglicans really wish for "contracting-out" if a sufficient increase in Government grant can accompany it. The Government are prepared to offer something more than forty-seven shillings of grant per child. So that "contracting-out," which, as a sole expedient, is dead, may revive as part of a dual expedient in a particularly insidious form.

Lord Stanley of Alderly has introduced a Half Time Bill into the House of Lords, but he does not expect to carry it this session. The Children's Bill in the House of Commons, if not the Government Education Bill itself, may perhaps afford opportunities for raising the Half Time question. What, for the House of Lords, must be counted as quite a fiery debate arose on the motion of Lord Barnard, who raised the question of the £100,000 grant for new Council schools—"spite schools," as they are called in Wales. The Training College question drags along towards the difficulty which will arise when the Board of Education's regulations as to undenominationalism come into contest with the unaltered trust-deeds of some of the colleges. And thus, in one form or another, the eternal religious question bothers, hampers, and injures the schools. Small wonder that most eyes are beginning to turn—reluctantly, but in despair—towards the so-called secular solution. Yet at the same time one must register a kindlier feeling among people belonging to different Churches, because of the co-operation between Churches in the fight for the Licensing Bill.

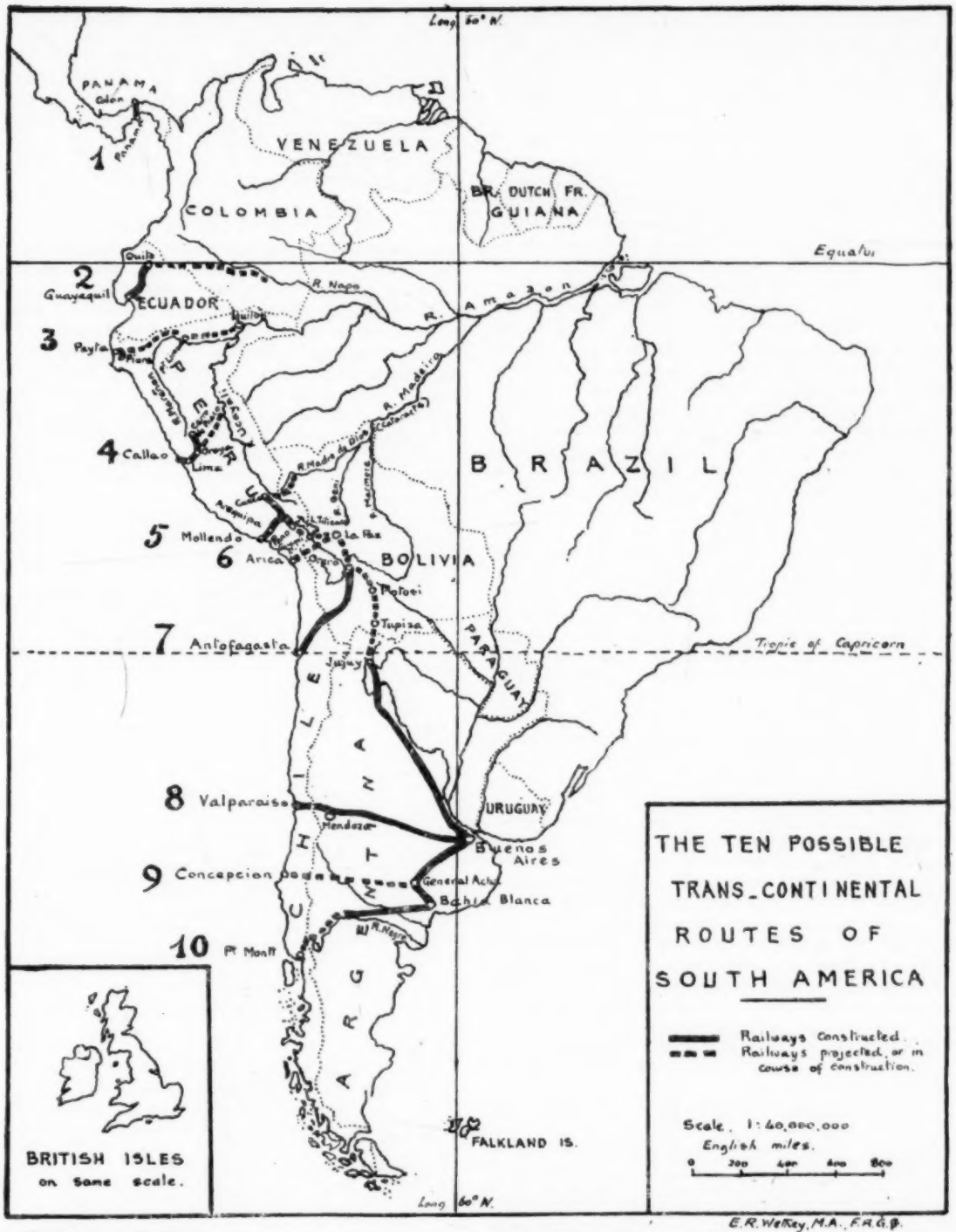
GEOGRAPHY NOTES UP-TO-DATE.

BY E. R. WETHEY, M.A., F.R.G.S.

Trans-Continental Routes of South America.

A RECENT article in the *Times* has drawn attention to the fact that, with the exception of the short Panama railway, not a single railroad crosses the continent of South America, though at least two are within a few years of breaking the record. It is, of course, partly a geographical and partly an ethnological reason which accounts for this backwardness as compared with the progress of the northern half of the continent. The cordillera of the Andes forms an unbroken obstacle of some 4,000 miles right down the western side; nor are its passes to be compared, from an engineering point of view, with those of the "Rockies." That the widest part of South America lies within the Tropics, while practically all North America is in the Temperate Zone, is simply another way of saying that climatic conditions have presented another formidable obstacle to the development of commerce and communications. And, finally, the constant stage of recurrent revolution in which every South American country is for ever finding itself tends to the same end. The occasion, however, is opportune for examining whereabouts it may be possible in the future—for South America, like China, is waking up—to develop the great through-lines of communication.

A study of the most recent maps shows ten transandine lines which may become the starting-points of future trans-continental routes. Here is the list:—



1. The Panama Railway.
2. Guayaquil to Quito.
3. Payta to the river Marañon.
4. Callao to Oroya.
5. Mollendo to Cuzco.
6. Arica to La Paz.
7. Antofagasta to Oruro.
8. VALPARAISO TO BUENOS AIRES.
9. Buenos Aires to Concepcion.
10. Bahia Blanca to Port Montt.

Of these, No. 1 has, of course, been completed many years, but is obviously not entitled to be designated a real trans-continental route. Nos. 2–6 are mixed rail and river routes. Nos. 7–10 will be railroads pure and simple. The land and water routes are, for the most part, Peruvian schemes for making use of the excellent navigable capacities of the Amazon and its numerous tributaries. Perhaps the most important of them is No. 3, which has for its "Atlantic" objective the

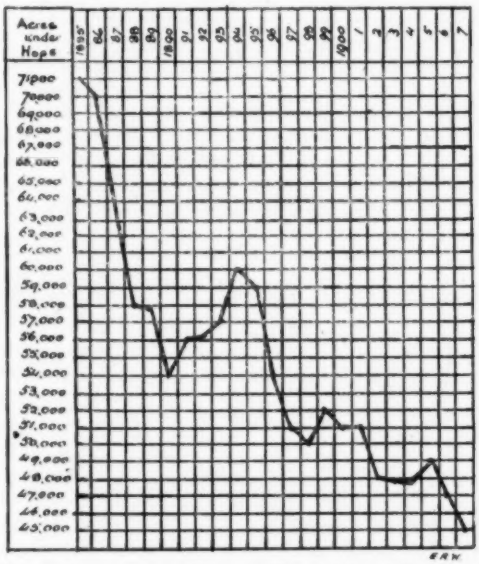
Peruvian river-port of Iquitos, already accessible to ocean steamers from Liverpool and Hamburg. The first stage of the project would be to continue the existing Payta-Piura line to the head of navigation on the Marañon at Port Limon, and several advantages would favour this project. Payta has all the makings of a first-class harbour; Piura is the centre of a cotton-growing district; passes are known at a height of under 7,000 feet. Once Port Limon were reached, the further extension of 300 miles to Iquitos would follow as a matter of course, if only to avoid the expenses of transhipment. No. 2—the Quito line—looks simple enough, but Ecuador will have to settle various boundary disputes with Colombia ere this idea can be attempted. Nos. 4 and 5 are famous examples of engineering enterprise. The Oroya railway is the highest in the world, and crosses the Andes at an elevation of 15,665 feet above sea-level, while the Arequipa line ascends to within 1,000 feet of the same height. These two would probably utilise as their river routes the Ucayali and the Madre de Dios, the former of which, at its confluence with the Amazon, is a mile wide and fifty fathoms deep. The Madre de Dios flows into the Madeira just where a railway is necessitated by a series of rapids, which extend over a distance of 200 miles and seriously interrupt the communication between Bolivia and Brazil. Nos. 6 and 7—the Arica and Antofagasta lines—may also make use of the Amazon tributaries indicated on the accompanying map; but it is more probable that, if and when these undertakings show signs of definite completion, the Argentine extension from Jujuy will be pushed forward. As it is, work is going on now between Guaqui (the port of La Paz on Lake Titicaca), La Paz, and Oruro. The ultimate effect of such a connection would be that La Paz will be only three weeks from London *vid* Buenos Aires, and Cuzco will be at least a fortnight nearer Europe than it is at present. No. 8 will almost certainly be the first of the projects completed. Indeed, contract time fixes 1910 as the opening year. There is only one short link left to join up, but it is a difficult one. Its main feature is a three-mile tunnel, bored 2,000 feet under the famous Uspallata Pass itself, 12,800 feet above sea-level.* It is interesting to note that some of the engines to be used on this route were built at Darlington—huge "Decapods," each of 124 tons, and so bulky that they had to be carried from the works to Liverpool and Hull on a Sunday, when the four metals could be reserved for the journey. The remaining projects—Nos. 9 and 10—are still very much in the air. The Concepcion line will run across the flat territory of the Pampas; the Port Montt route will make use of the southern river Negro.

It remains to note that there is, at all events, one great inducement to the building of these transandine railways. The regions traversed everywhere are rich in marketable commodities. Staple articles of trade at once occur—gold, silver, copper, tin, and coal amongst minerals; cotton, sugar-cane, rubber, timber, wheat, maize, cacao, and coffee in the vegetable kingdom; wool and live-stock products in the animal world. There are all climates, there are therefore all products. Modern means of distribution alone are lacking.

* This is but one of many signs of the Argentine's activity in the matter of railway-building. She owns more than one-third of all the railways in South America, and is the only country there which can show anything approaching a "network" of rails. Those who are interested should read Koebel's recent work, *Modern Argentina* (Griffiths, 1907). On this particular railway he says (p. 263): "This lengthy double-thread of steel passes almost in a straight line across the continent. At that point, however, where the actual passage of the main Andes chain is achieved, there is a gap in it that coaches and mules serve to fill. But the gap will not remain for long. There are men working, ant-like, in the midst of those stupendous heights, scores of miners from the Simplon amongst them, who, having fought their way through one of the earth's greatest obstacles, are now involved in a fierce struggle with another . . . In order to comprehend the titanic nature of this task . . . it must be understood that these mighty Andes are being tamed and bridled with steel at a height of over 10,000 feet above the level of the sea! (The Simplon tunnel, though twelve miles long, is only 2,300 feet above sea-level.) The difficulties and discouragements have, as may be expected, proved enormous, but the work has been persevered with. And now in two or three years' time the tunnels will have been bored, the snow-sheds constructed, and the traveller, even in midwinter, will sit undisturbed in his carriage as it threads its way through the gorges and peaks of the main pass itself."

The Decline of Hops in England.

Simultaneously with the outcry of the brewers against the Government's new Licensing Bill comes the bitter wail of the Kentish hop-growers that their hop gardens are fast going out of cultivation. Of a truth the "Trade" is in a parlous condition. With the politics involved we have nothing to do, and there are "politics" in *both* cases. The causes, however, of the Kentish lamentation have a good deal of interest for teachers of "economic" geography. The figures of the annexed table are very striking. The acreage under hops in the British Isles has steadily declined during the last twenty or thirty years, until now it is little more than



The Decline in the British Hop-growing Industry.

half its former extent. The first official figures only date back to 1868, when some 65,000 acres were cultivated. Ten years afterwards the record figure of 72,000 acres was touched, and then the decline began. Ireland is no longer the only distressful corner of the United Kingdom; Kent is a serious rival. Several reasons are forthcoming for this decline. The exhausting nature of the crop, and its extreme variability of production, tend to a certainty of expense and an uncertainty of profit. No crop demands a richer soil or takes more out of it. The average yield per acre is calculated at from 8 to 10 cwt. As much as 25 cwt. has been obtained, but the yield is very uncertain. In three years—1888, 1899, and 1905—taken haphazard from a long series of Kentish figures, the crop from a particular hop garden came out at 5, 13, and 15 cwt. respectively. In 1901 a total crop of 650,000 cwt. was harvested on practically the same acreage which

the year before had produced 350,000 cwt. Indeed, acreage in this particular branch of agriculture is not much of a guide to production. The United Kingdom annually produces as much as the whole German crop on an acreage little more than half as large.

What, however, more than anything else has injured hop-growing in England is—as in most agricultural questions—foreign competition. Whether it is true or not that American and Continental hops possess better "keeping" qualities, or that British methods of growing and picking are antiquated and expensive, the fact remains that the Kentish hop-grower is engaged in an unremunerative industry. A meeting of growers held recently at Canterbury declared—and adopted its declaration by resolution—that the average cost of growing hops and producing 10 cwt. per acre amounted to £45 to £50, and this with hops selling at £3, 10s. per cwt. Compare such figures with those of fifteen to twenty-five years ago, when the cost worked out at £35, 10s. the acre, and the price obtainable at from £10, 15s. the cwt. The proposed Kentish panacea we must leave to politicians and the Select Committee of the House of Commons appointed to consider the whole question. The men of Kent demand a 40s. import duty per cwt., and point to the United States 46s. tax, the Russian 34s. 6d., the French 12s. 6d., and the German 10s. as useful examples.

The Commercial Geography of the Hop.

It is interesting to note that though hop-growing on a large scale is quite of modern growth, the industry is an old one. It is not known who first discovered that hops were a valuable raw material for beer-making, but there were *humularia*, or *humuleta*, "hop gardens" existing in France and Germany as long ago as the eighth and ninth centuries. Belgium—or Flanders, as it was then—has the reputation of sending the first seeds over into England between 1520 and 1524. Fifty years later hops are mentioned as a well-known crop by Reynolde Scott, an Elizabethan writer on agriculture. But it did not apparently find much favour, if we may judge by a petition sent up to Parliament about the beginning of the seventeenth century against the use of hops as an offensive commodity which would spoil the taste of the people's drink! At the present time 60 per cent. of the British hop acreage is in Kent. Hereford 15 per cent., Sussex 10 per cent., and Worcester 8 per cent. account for most of the rest, the only other counties engaged in the industry being Hampshire, Surrey, Shropshire, Gloucester, and Suffolk. The importance of the soil we have already mentioned. "Kents" are a capital instance of the influence of geography upon trade. In order of quality they come upon the market as "East Kents" (grown largely on the *chalks*), "Bastard East Kents" (on *alluvial* and *mixed* soils), "Mid-Kents" (on *Greensand*), and "Wealds" (on Weald *clay* and Hastings and Tunbridge Wells *sands*). Our import of hops amounts to some 30 per cent. of our total supply. This comes chiefly from America and Germany. The latter country and the United Kingdom are responsible for 50 per cent. of the world's supply of hops, in fairly equal proportions. The great German state is Bavaria, more particularly Middle Franconia in the west and north of the Danube. The only other large cultivators are the United States (principally now in the three Pacific states) and Austria (Bohemia). The general importance of the industry, quite apart from its specific use as a raw material, may be gauged from the number of trades which have an intimate interest in it—for example, those supplying artificial manures, hop washes, sulphur, wirework, twine, etc.—and from the fact that at least £1,500,000 was spent in labour alone on the English hop gardens in 1907.

Farewell the Rocky Mountains!

American geographers, like American politicians, are nothing if not revolutionary. Recent decisions by the United States *Geographie* (how we dislike the word!) Board have run amok in the West, and the "Rockies" of our youth have fallen from their high estate. What we are accustomed to call the "Rocky Mountains"—the great Western system of Highlands—is now labelled officially the "Cordilleras," while the old name is narrowed down to include only the eastern ranges—that is, those running through Montana, Idaho, Wyoming, Colorado, New Mexico, and Western Texas. The western edge is to be known as the "Pacific Range"—that is, the Cascades, Sierra Nevada, and Coast Ranges. The worst of it is that no decision is issued as to the "Rockies" of Canada. Perhaps the American "Geographies" do not recognise the Loyalists as having any claim to any Rocky Mountains at all!

COMMON-SENSE HINTS ON THE TEACHING OF ARITHMETIC.

BY AN INSPECTOR OF SCHOOLS.

(*Continued from page 522.*)

IT will be seen from the foregoing examples how mental arithmetic may be interwoven with the written arithmetic, and the aim of the teacher should be in this direction. The mental should be the handmaid of the written. They should not be divorced, as is too often the case. As Shakespeare tells us in *The Merchant of Venice*, "mercy seasons justice," so the mental should, as it were, "season" the written arithmetic, and in a great degree, and both will be rendered more effective by a wise contact.

If this aim were kept in view in the earlier stages of the subject, one would not have to complain so frequently of written side-work appearing in the exercise books of the upper classes, where calculations could have been easily reached mentally. Let me illustrate what I mean; and I will give no suppositious instances, but some which have come under my actual experience.

In Standard IV.—£3, 16s. 10½d. is to be multiplied by 10, and this is some of the side-work:—

$$\begin{array}{r} 16 \\ 10 \\ \hline 160 \\ 8 \\ \hline 168 \end{array}$$

$$12\overline{)105} \qquad 20\overline{)168}$$

8s. 9d. £8, 8s.

In Standard V:—

$$\frac{5}{6} + \frac{1}{3} \qquad \frac{5+2}{6} = \frac{7}{6}$$

Surely this side-work is quite unnecessary, and denotes mechanical teaching in the earlier steps. And it is this divorcement of the mental arithmetic from the written that causes that palpable and regrettable lack of reasonable rapidity one so often meets in the working of examples in the upper part of the school.

A teacher should remember that just as one of the elements of good writing is "rapidity," so is it also a

necessary essential of good arithmetic. I do not lay much stress on the complaints of a business man who grumbles that the office boy is so long and so roundabout in making his calculations, but I do say he would have less cause to complain were the mental arithmetic not kept in a watertight compartment instead of forming the foundation of the written. And here let me add, though on my own responsibility, that I would rather see an inaccurate answer—so long as it does not violate common sense—arrived at by the aid of mental calculation, than an accurate one reached by unintelligent and laborious side-work.

I am introducing this appeal for conjoint written and mental work at what may perhaps seem an early stage of my articles, but I do so because of its importance, and because of the necessity of making this advice a starting-point, and something to be kept prominently in view right from the commencement. My plea must take the form of a well-known proverb, "It is no use locking the stable door when the horse is gone." Since Scheme B came into operation there is a decided danger that children may—and I believe they do—get too little variety in the teaching of arithmetic. I have noticed exercise books where money sum succeeds money sum with insensible and even absurd frequency. A list of mechanical additions in money is followed by a list equally long and equally mechanical in subtraction, multiplication, and division of money, till at last the child gets the idea that "money sums" are the "be all and end all" of arithmetic.

There is a want of intelligent revision of back work where what I may call "pure numbers" are employed.

This, what I may term "money saturation," is so frequently apparent that when I have asked children to find out for me the number of children in a school of 87 boys and 10 girls I have not been in the least surprised to find this absurd result :—

s.	*d.*
8	7
1	0
9	7

It may seem incredible, but nevertheless it is perfectly true. So frequently have I met with this that my advice now is, "Let two money sums be succeeded by one with pure numbers." Some teachers work on the idea that the first three or four months in the year are to be taken up in the learning of rules, and that the application of the rules is to be left to the latter part of the school year. In such cases the arithmetic in the earlier part of the year is mechanical, and the child is asked simply to *calculate*, and not to *reason*. And even where this rule-learning is the only aim for the first part of the year, it might be more, if I might use such a term, intelligently carried out.

It lacks variety in the attack, and also a sense of proportion. This is what I mean. For perhaps a month one rule only receives attention, then for the next month another takes its place, and the former is laid aside; and so rules succeed each other like the months of the year: there is a succession, but not an intermixture. When the child has become sufficiently acquainted with one rule, this should be left, but only for a short time, and a new one taken up. The new rule should be learned, the old one not forgotten; and this will be done by varying the teaching of a new rule with the application of the old—a process that will arouse more interest and develop more intelligence.

This practice of rule-learning in the way I have just stated, of succession instead of combination, is not confined to the lower classes. One frequently finds in Standard V. a long list of sums in practice followed by a list of bills of parcels, and so on; and in Standard VI. it seems that, at least in the earlier part of the year, vulgar and decimal fractions have no connection.

I think the reason for this unintelligent treatment is a too slavish adherence to the exercises in the textbook used. Some teachers think that *all* the exercises in an example are to be worked, not that what is wanted is only a judicious selection with sufficiency.

And now, having given warning and advice, let me turn to the arithmetic of Standard II.

In Standard I. the four simple rules have been taught. The aim in Standard II. should be the further extension and application of these four simple rules. Taught intelligently, the children will perceive that the "money sums" they are now doing are really their old sums of Standard I. with a different denomination and a different base. And at their first introduction to these money sums the children will get a clearer grasp, and realise when ten is to form a base or when twelve is, if some such exercises as the following be given. A man has 4 bags and 15 oranges in each, how many oranges has he? (Ans. 60.) Followed by, What was the cost of 1 bag? (Ans. 1s. 3d.) What was the cost of 4 bags? (Ans. 5s.) Then, What would 60 penny oranges cost? (Ans. 5s.)

They will realise that in 4 times 15 their base was 10, and that in 4 times 1s. 3d. their base was twelve, and it will be interesting for them to see that they get an answer of 5s.

I am quite sure that practice in using 10 and 12 as a base is very much required in this early stage of dealing with money. For it is difficult for a child to part with his old friend 10 and take up a new one, 12. This difficulty will be perceived if a Standard I. child is asked what 10 and 5 are, and then what 15 pence are. I have frequently had 15 pence given me as 1s. 5d. I certainly would advocate the learning of the multiplication table, and also of the money table, but I would also strongly advocate an intelligent connection of the two tables, so that if memory fails reason comes to the rescue. For instance, in the earlier stages children should be taught to convert tens into twelves thus :—

17 = 1 twelve and 5 ∴ 17d. = 1s. 5d.
21 = 1 „ „ 9 ∴ 21d. = 1s. 9d.
29 = 2 „ „ 5 ∴ 29d. = 2s. 5d.

Such exercises as these, supplementing the learning of the money tables by heart, will prove beneficial. This division by 12 in connection with money might be further extended thus :—

(*a*) I have 59 rows of cabbages, and 72 in each row. How many cabbages have I? (Ans. 4,248.)

(*b*) How many rows should I have if 12 cabbages formed a row? (4,248 ÷ 12. = Ans. 354.)

(*c*) How many shillings should I get for them at a penny for each cabbage? (Ans. 354s.)

(*d*) In the first sum, what would a row cost at a penny each? (Ans. 6s.)

(*e*) Then what would the 59 rows cost? (Ans. 59 × 6 = 354s.)

(*f*) How could I get from the first sum the number of cabbages in 60 rows? (Ans. 4,248 + 72 = 4,320.)

(*g*) How many shillings would these cost at a penny each? (Ans. 354 + 6 = 360s.)

It will be found useful practice to resolve numbers into tens and twelves still further. Thus :—

Put 132 into tens and twelves. (Ans. 13 tens + 2; 11 twelves.)

Put 121 into tens and twelves. (Ans. 12 tens + 1; 10 twelves + 1.)

Such exercises will connect the ordinary multiplication table with the pence table, and show how the latter can be built up from the former.

In the original sum (*a*)—

72
59
648
360
4248

The children should be asked to write down, after seeing this working, the number of cabbages in 50 rows—namely, 3,600; and they should have practice in varying the working by occasionally starting with multiplying first by the *tens* figure, then by the *units* figure.

I would advise every teacher to form a collection of intelligent problems suited to his own particular class; and if he can think these out for himself, they will probably be more valuable than those culled from text-books, because the interest aroused in framing them will be transferred to the teaching of them. One object to be kept in view in devising these problems is the setting of those that can be done in more than one way. Let me give an example suited to Standard II., or even Standard III. :—

I gave 20 boys 20 marbles each, and then had 20 marbles left for myself. How many had I at first ?

The ordinary procedure is $(20 \times 20) + 20 = 420$ marbles. But a scholar more discerning than his comrades may see that a shorter way to get the desired result is, 21×20—that is, 420. And if no pupil is sharp enough to see this shorter way, the teacher will, after working it in the ordinary manner, point it out. This will have a beneficial effect, as the scholar, when he faces a problem, will not only think how to get the answer, but how to get that answer in the shortest and most intelligent manner.

Just one more example within the range of Standard II. :—

There are 97 boys in a school, and 10 *more* girls than boys. How many children are there in the school ?

The child should be encouraged to use his mental arithmetic thus :—

97 boys
107 girls
204 children

rather than obtain the answer in this manner :—

97 boys
10 girls
97 girls
204 children.

And the mental should come into play again by requiring the scholars to give the number of children in two such schools, and even in three or four, without using slate or paper. Thus :—

In 2 schools there are $(200 \times 2) + (4 \times 2) = 408$.
In 3 „ „ „ $(200 \times 3) + (4 \times 3) = 612$.
In 4 „ „ „ $(200 \times 4) + (4 \times 4) = 816$.

One more example for Standard II. :—

In a school are 57 boys and twice as many girls. How many children are in the school ?

Ordinary solution :— 57 boys
114 girls
171 children.

More intelligent solution :—57
3
171 children.

Mental solution $(50 \times 3) + (7 \times 3) = 171$.

A SUBMARINE SPONGE GATHERER.

WITH BLACKBOARD DRAWINGS BY H. WILKINSON.*

ORIGINALLY sponges were collected from the bed of the ocean by naked divers (Fig. 1), with con-

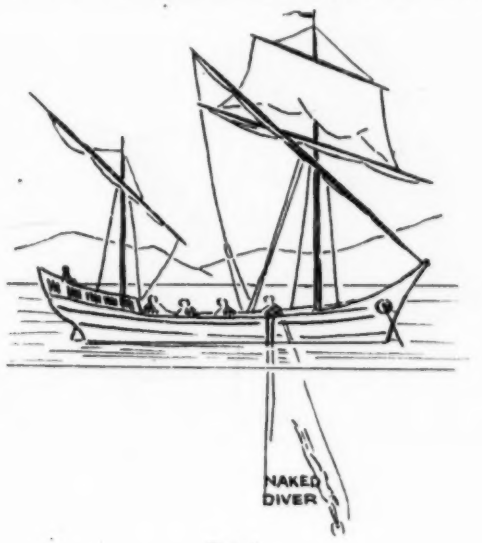


FIG. 1.

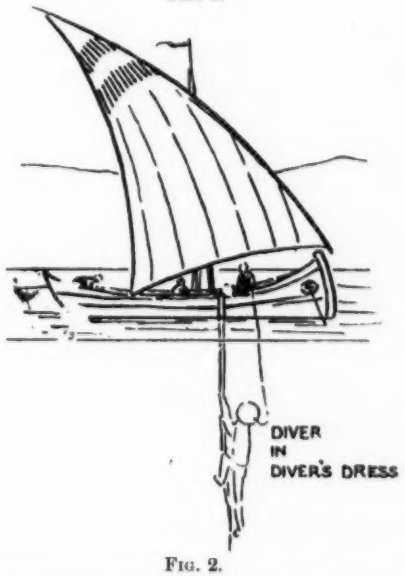


FIG. 2.

* With acknowledgments to the *Illustrated London News* of March 14, which contains reproductions from drawings supplied by Messrs. John Philips and Sons.

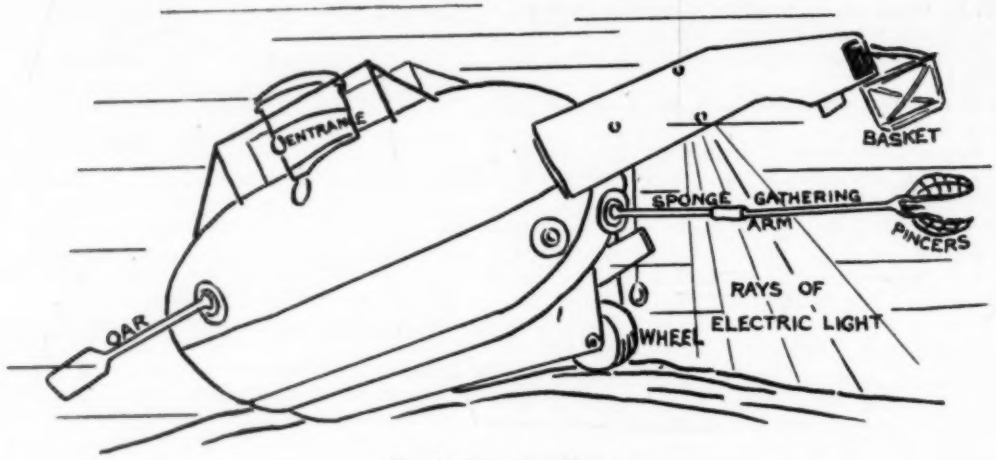


FIG. 3.—EXTERIOR VIEW.

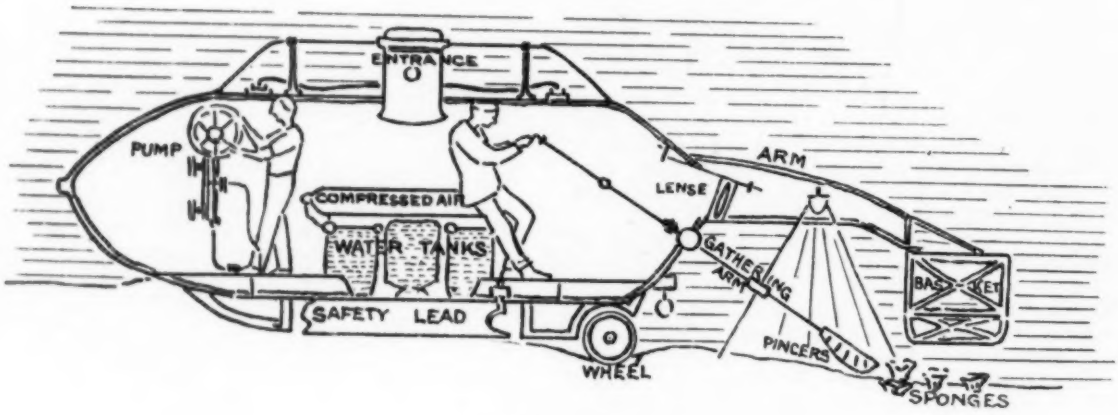


FIG. 4.—SECTIONAL VIEW.

stant risk and frequent loss of life. Following this came the employment of divers in regulation diving outfits (Fig. 2). Recently an ingenious contrivance, in the form of a submarine, has been invented by the Abbé Raoul, the Vicar-General of Carthage.

This invention has successfully passed the tests of its power to resist great pressure. The vessel measures seventeen feet in length, is seven feet in diameter, and is manned by two men, one of whom works the air-pump, while the other attends to the sponge gathering. The submarine is propelled by means of two oars (Fig. 3), no engines being employed. It sinks to the ocean owing to the weight of the water in the tanks and the "safety lead," weighing 1,625 lbs. It rises to the surface again when the tanks are emptied by means of the pump. In cases of emergency—that is, when the pumping arrangement refuses to act—the safety lead can be released, and then the submarine rises to the surface of its own accord. Fig. 4 shows a sectional view of the invention, and the action is self-explanatory.

NOW READY.

THE ALERT ARITHMETICS, BOOKS I. AND II.

The first two Books of an exceptionally interesting set of Standard Arithmetics, of which the special feature is the large number of Blackboard Sketches.

THOMAS NELSON AND SONS.

THE NORTH-WEST PASSAGE.

WITHIN a few months there will come sailing out of the Arctic, beating its forgotten path back to civilisation and England, an old wooden English warship that passed through Behring Strait into unknown seas and icy shadows more than fifty-five years ago. Since September 24, 1851, his Majesty's ship *Investigator* has been frozen in the ice in Mercy Bay, Behring Island, in the interminable lacework of land and sea to the north of North America. It was as commander of this famous old ship that Sir Robert M'Clure made his memorable voyage and traversed the Polar Sea during his search for the Franklin expedition.

Last summer was a mild one, and the Arctic ice of Mercy Bay melted for the first time. Advices have been received at Victoria, British Columbia, from Dawson, brought there from Fort M'Pherson by Mr. Audrey Forrest, a snowshoe courier, to the effect that the mildness of last summer and this winter has liberated the famous old ship, and the whalers from America have visited it, and are lying by in Mercy Bay with the hope of towing the old craft clear of the island and bringing her back to Alaska, and so to British Columbia.

A full report of the *Investigator's* condition has been made by Captain Jarvis of the North-West Mounted Police, who says that the cold and ice have preserved the vessel, and that she is to-day probably as sound as she was when Captain M'Clure abandoned her in 1854. Her instruments and fittings are in good condition, with the exception of her sails, and it is possible, and even likely, that she may sail home to England. Captain M'Clure died in 1873.

Our Art Section.

YOUTHS AND MAIDENS IN ART.*

BY HAROLD ARMITAGE,
Author of "A Life of Greuze," etc.

VII.—Concluding Article.

THIS article must open with an apology. In the chapter on Reynolds—the fifth instalment of this series—it was stated that the Penelope Boothby painted by Sir Joshua was not the same little girl whom Banks the sculptor immortalised in a statue in Ashbourne Church in Derbyshire. The statement was inserted many miles from books of reference, and upon what seemed to be reliable internal evidence; but the fact remains that both artists had the same engaging little girl for a subject.

Penelope was the only child of Sir Brooke Boothby, her parents were devoted to her, and she died when she was six years of age. As the inscription upon the monument at Ashbourne says: "The unfortunate parents ventured their all on this frail bark, and the wreck was total." The statue is one of the most tender works of art in the realm, and it has an additional interest in that it may have helped to suggest to Chantrey, a native of Derbyshire, the form and sentiment of his masterpiece, "The Sleeping Children," one of the treasures of Lichfield Cathedral.

This beautiful monument by Chantrey, which has won world-wide fame, was executed to perpetuate the memory of the two children of the Rev. William and Mrs. Robinson. The father died, and not long afterwards the eldest girl was accidentally burned to death. Then the other little girl, the only remaining child, became ill and died. A friend of the distracted mother asked Chantrey to take a cast of the child's face, so that a monument might be erected; and Chantrey, complying with the request, had an affecting interview with the unhappy mother, who happened to mention that each night she had hung fondly over the girls as they lay asleep in each other's arms. It occurred to Chantrey that this would be an appropriate form for the monument to take, and the result, as we know now, is one of the most touching pieces of sculpture in the world.

"The Frown" (Webster).

"The Sleeping Children" (Chantrey).

Chantrey occupies an honoured place in English art, and his work is strong and manly. His was a robust, virile, jovial figure in the world of painters and sculptors, and his character was frank, his disposition generous, genial, and hearty. He was the son of a joiner and small farmer, and was born at Jordanthorpe, Norton, in the north of Derbyshire, four miles from Sheffield, the Yorkshire town to which, as a boy, he went with a donkey to sell the produce of the farm. Apprenticed to a Sheffield grocer, he soon tired of that uninspiring occupation, and found more congenial employment with a carver and gilder. Removing to London, he rapidly won both fame and a large fortune. His works are manifold, but none ever touched the hearts of the people as did his statue of "The Sleeping Children."

At Pimlico, where Chantrey died in 1841, a famous painter of youths and maidens, Richard Webster, was born in 1800. His father, who was one of the servants of George the Third, intended to make him a musician, and the boy was trained for this pursuit at St. George's Chapel, Windsor; but he became a painter, and his favourite subjects are scenes in the lives of schoolboys. In 1841 appeared two of his works, which, by means of engravings, have enjoyed a wide and lasting fame. They embody the substance of a few lines from Goldsmith's poem of "The Deserted Village":—

> "A man severe he was, and stern to view;
> I knew him well, and every truant knew:

* The Editor regrets the enforced omission of Mr. Sparkes's paper on British Mezzotinters owing to extreme pressure upon space. The series will be resumed next month.

Well had the boding tremblers learned to trace
The day's disasters in his morning face;
Full well they laughed with counterfeited glee
At all his jokes, for many a joke had he;
Full well the busy whisper circling round
Conveyed the dismal tidings when he frowned."

Webster's other pictures are all of a similar kind, representing village life at its best and in its most delightful aspects. The artist died at Cranbrook, in Kent, in the year 1886.

Schoolboys and their doings form also the subject of most of the pictures of Mulready, a pleasing artist, contemporary with Webster. Although a generation has arisen to whom Mulready is not of much account, he does not deserve to be forgotten, for he was yet a true artist, and he displays many an excellent quality in the painting of his homely subjects. His picture of "The Wolf and the Lamb" was painted in the year 1820, and for many years engravings and other reproductions were very

"The Wolf and the Lamb" (Mulready).

common in children's books and elsewhere. The picture itself marks an advance upon most of his previous works; but Mulready used asphaltum in the painting of it, with the result that parts of it soon began to show signs of deterioration. Some of the ravages were repaired in 1854, under Mulready's direction, so that the picture might go to the Paris Exhibition of 1855. Later, however, the picture began to decay to such an extent that Queen Victoria, who had inherited the work from George the Fourth, sent it to Mulready to see if he could arrest this ruin. He kept it for three months, and then returned it, saying that unless he scraped out the parts that were affected he could not save it. In other hands, however, further destruction has been stopped.

It is characteristic of Mulready's abounding good-nature that though this picture was so very popular he gave up his rights with regard to engravings of it, so that the profits might go to a fund for the succour of poor artists. The picture was engraved by J. H. Robinson, whose work is regarded as one of the best engravings ever executed, and the impressions brought more than £1,000 to the fund.

Mulready did not give these engravings because he was a rich man. There was a time when he had a wife, four children, nothing to do, and was £600 in debt. He had known what it was to endure two winters without a fire in his studio, and to spend dark evenings with no more light than that of a rush-candle. These things did not daunt Mulready, and they did not quench his gaiety. He was a hard worker and close student until the end; but he was also a man of robust physique, full of high spirits, strong as a lion, and fond of boxing and other such exercise.

The artist had many friends. Like Yorick, he was "a fellow of infinite jest;" like Yorick, his flashes of merriment were "wont to set the table on a roar."

"The Rabbit on the Wall" (Wilkie).

He gave of his money and experience generously, and the poor who needed assistance, and the students who asked advice, were never sent empty away. "A friend testifies to his having for a considerable time supplied a poor sick fellow with luxuries such as he rarely took himself, and were invaluable to an invalid. Almost daily Mulready, by his own hands, filled a little basket with good things, and going for his evening walk, left it at the sufferer's door, without a word beyond a kindly inquiry."

Mulready, who worked slowly and carefully, with indomitable patience, achieved accurate drawing, brilliant colour, exquisite finish, and great technical skill. There has been a tendency in high quarters to look askance at his homely subjects, and Ruskin has alluded to Mulready's work as "perhaps the most forcible illustration ever given of the frivolous application of great powers;" but, on the other hand, the same critic says that

"'Burchell and Sophia in the Hayfield' and 'Choosing the Wedding Dress' remain in my mind as standards of English effort in rivalship with the best masters of Holland."

The painter of "The Wolf and the Lamb" is mentioned more than once in the diary of Wilkie. One entry runs: "January 30, 1814: Mulready came to sit for the head of Duncan Gray, which I painted in entirely." Thus have we evidence of the friendship of two artists who were working the same vein, and it is believed that Mulready's ambition received some impetus from seeing the pictures of Wilkie, who was the elder man.

Probably no great artist has given more pleasure to more people than kindly David Wilkie. Every one can enjoy his pictures—the old and the young, the learned and the simple. Who has not in heart joined in his rollicking game of "Blind Man's Buff," danced at his "Penny Wedding," partaken of the good things in his "Village Feast," felt a generous sympathy with his "Blind Fiddler," mingled with the cotter's children to enjoy "The Rabbit on the Wall," and argued with his "Village Politicians"? Not to have seen his genial pictures is to have missed one of the most humanising elements in life.

Wilkie was born, in 1785, at Cults, a little village in Fifeshire, where his father was the minister. Probably his happy boyhood led to the good-humour of his pictures. He could draw before he could read, and paint before he could spell. When he was sent to school, he spent much of his time making portraits of his companions, which they bought from him for marbles, pencils, and such things. At fourteen years of age he commenced four years' work at the Edinburgh School of Art, and then went back to Cults and painted landscapes. "Pitlessie Fair" was inspired by a fair he saw in a neighbouring village, and this picture having been sold for £25, Wilkie went to London with the money. He was fortunate, for success came in the following year with his "Village Politicians," and he was never poor again. Afterwards he travelled much, visiting Italy, Spain, Holland, and Germany; and it was while he was returning from one of these journeys in 1841 that he died on board the *Oriental*, and his body was solemnly committed to the deep. The "Burial of Wilkie" has, as every one knows, been immortalised by Turner.

During his life Wilkie had received many honours. He was knighted, and the Duke of Wellington gave him twelve hundred guineas for "The Chelsea Pensioners listening to the News of Waterloo." When this picture was exhibited, "young and old, rich and poor, crowded to see it; soldiers hurried from drill, and pensioners hobbled on their crutches, whilst the heroes who are represented in it were recognised and proclaimed with a shout of delight." So great was the crowd that the picture had to be protected by a rail. Indeed, it has been said that this painting caused as great a stir in London as the battle of Waterloo itself. In 1907 the London County Council placed a tablet on No. 144 Kensington High Street (formerly known as 29 Lower Phillimore Place) to inform those who pass by that in this house lived Wilkie the painter.

Read the interesting announcement about the
ART SECTION "HONOURS PAGE"
On Page 580.

THE PAST AND FUTURE OF EDUCATIONAL HANDWORK.

ADDRESS BY DR. KIMMINS, CHIEF INSPECTOR OF EDUCATION, LONDON COUNTY COUNCIL.

THE annual meeting of the London branch of the Educational Handwork Association was held at the Norland Institute, Pembridge Square, W. The secretary, Mr. Wootton, read the annual report, which showed that the membership is still increasing. He also referred to the summer course of handwork at Scarborough as being very successful, one hundred and forty-five students, mostly teachers, having gone through the course last year. There was also a local teachers' class in handwork held at Stroud Green, which was doing good work for London teachers. The officers of the association were then re-elected, Mr. Wootton as secretary, and Dr. Kimmins as president. It was felt that Dr. Kimmins had been such a hardworking and successful president during the past year that he could not be allowed to vacate that important position. He was the right man in the right place, and was in no sense merely an ornamental figurehead. In proposing the list of vice-presidents for re-election, Mr. Hudson remarked that it was felt that the premier position was undoubtedly held by their genial hostess, Mrs. Ward, who had pioneered the movement in London, and gave the necessary impetus to the important work undertaken by the Handwork Association. Two new vice-presidents—Sir John Cockburn and Dr. Slaughter—were unanimously elected.

Dr. Kimmins, in reviewing the work done during the past year, laid special emphasis on the notable lectures of Dr. Slaughter and Dr. Thomas—the former dealing with the subject of handwork from a psychological standpoint, and the latter dealing with its physiological basis. These lectures from well-known experts were so valuable, and had been so highly appreciated, that he hoped to arrange for similar lectures dealing with some other aspects of handwork. Thus he anticipated that Sir Philip Magnus would favour them with an address on "The True Place of Handwork in the School," and Professor Adams had also promised a paper on "The Effect of Handwork on the Development of the Intelligence." Referring to the difficulty of seating the increased number of teachers who attended these lectures, it was felt that some larger room was necessary, and he was glad to say that they had arranged to hold future meetings in the lecture-room of the Society of Arts.

It was increasingly noticeable that public opinion was growing in favour of more handwork in schools. As Sir John Cockburn remarked at a conference of manual-training teachers recently held, "The brain is not a temple made without hands," and for the complete mental development of our children it was imperative to have a full scheme of handwork so that the necessary muscles might be fully trained. In our infants' departments there was such a scheme, and it kept improving year by year; but between the ages of eight and twelve there was still nothing in the shape of handwork that was at all interesting except drawing. He was, however, pleased to say that a suitable scheme had been devised by their secretary, Mr. Wootton, which was about to be introduced and carried out in the Croydon schools. He hoped that some such scheme would be taken up by the teachers in London schools, and he invited all those interested to study the models which they would find exhibited in an adjoining room. It was easier, he thought, to get a suitable scheme of handwork for girls than for boys, and he found that in this respect the average work of girls of fourteen years was better than that of boys of the same age. We must take advantage of the newly-aroused public interest in manual training to push forward experiments in handwork, and do everything to put this important subject on a firm foundation. He hoped to see the time when the teacher of handwork would occupy a much more important and dignified position in our educational system.

It was acknowledged that the normal method of education had failed in some schools. He went recently into a school of very poor type, where the children came largely from criminal homes. There was a full staff of excellent teachers, and the discipline was splendid. In visiting the Standard V. room, he found that the children had just written an essay of which the teacher felt very proud, as being rather above their usual average. He examined the essays with great care. They gave evidence of much labour and effort, but the language and power of expression was feeble in the extreme. He thought that in school the children were required to deal too much with abstract ideas, while in their own homes their daily life dealt only with concrete things. Here the educational scheme had to a certain extent failed, and through no fault of the teachers. It was, of course,

sheer madness to apply the same scheme of work to such poor schools as could be applied to schools of a more favoured class, where the children did no outside work in shops and streets, and where home work could be done. Educational methods must be more adapted to the lives of the children.

A short time ago he visited a very poor school in Hoxton, where he found a class writing from the teacher's blackboard copy, in bold round hand, the words "River Thames." The boys were evidently in downright earnest about their work, judging from the extraordinary facial contortions which they exhibited in their efforts to get the best results. He asked how many boys had seen the river Thames, and found that not thirty per cent. had seen it, and this he afterwards found to be the case throughout the school. Their isolated lives were confined to a very narrow district of dingy streets and dirty slums. It distressed him to see a hard-worked teacher in such a school, dealing conscientiously with the "extension of the predicate." He was really quite tired of this eternal "extension of the predicate." He seemed to come across it everywhere. He would far rather see something more concrete in character and more suited to the capacity of this poor class of children. A rational scheme of education had certainly been helped by the experiments made in American schools. He did not think we could closely follow such schemes in England as that advocated by some eminent American educationists, where the curriculum of the school was made to follow generally the gradual development of civilisation among the primitive races of mankind. It must be remembered that a child of five years old is now an intellectual giant compared with the fully developed prehistoric man. The modern child, for instance, is perfectly familiar with fire and the methods of lighting it, and cannot feel an intense interest in learning the primitive ways of igniting a fire. The scheme may be an interesting experiment, but he attached no great educational value to it. It seemed to him like learning foreign geography when nothing was known of the geography of England.

He believed in the gospel of interest. Get the children interested, and you could do anything with them. In that dull period which follows the infant-school stage, when fairy tales had lost their charm, the child seemed to desire contact with *real things*.

In conclusion, the president expressed a wish to see an amalgamation of their society with the Manual Training Teachers' Association. It seemed more feasible than it did some years ago. He also wished to voice the thanks of the association for the hospitality of Mrs. Ward, who had provided them with headquarters. They felt that the Norland Institute was like a home to them.

Mrs. Ward, in responding, said that she was very pleased to do all she could for the cause whose promotion she had so much at heart. She also believed in interesting the child. She thought that the happiness of the child is what they should all work for. She greatly enjoyed visiting the modelling class in one of their recreative centres for children, and watch them taking much delight in making such things as birds' nests, with eggs, in plasticine or clay. When she told them to make just *what they liked*, she was more than surprised to find that most of them set to work to make *little coffins*.

At one of their sloyd classes, where the children were perfectly happy making useful articles to give away to their little friends, the vicar happened to come in, and, struck with the beauty of a toy, offered to buy it for a shilling. This mistaken action changed the whole aspect of the class. After that it was, "What can I earn?" instead of, "What can I make?"

The editor of the *Manual Training Teacher* said that one important function of their society was to educate the public, and teach them what was being aimed at by the advocates of manual training. He often had such questions as these asked him, "Do they sell these things?" and, "Do all these boys go into the carpentry trade?" showing an utter want of appreciation as to the legitimate function of manual training. He quite agreed that there should be one continuous course of hand training from the infants to the top of the school.

He did not want a child to be killed at seven, and resurrected at twelve years of age. Among other suggestions was one which had been carried out last year at Näas, where, besides the usual handwork course of sloyd, the students, mostly teachers coming from all parts of the world—from Iceland, Peru, Italy, and Japan—spent a fortnight in learning *how to play games*. It was noticeable that boys on the whole had a sense of fair play, and could play a losing game in the very best spirit, while girls, if they lost at hockey, felt aggrieved. They should strive in their schools to make boys more manly and girls more womanly.

Dr. Kimmins, in responding to a vote of thanks, said that there was a difficulty in getting practical men who were working out schemes suitable for large classes. A scheme of work which was eminently successful in a small class was not always suitable for large numbers. After all, we should consider that other people's schemes were not necessarily for imitation, but should always serve as an inspiration.

Mr. Wootton's scheme of handwork for lads between the ages of eight and twelve was on view in an adjoining room. The main idea was to make the various models shown, of thin prepared strips of wood, from working drawings.

Thus there were to be seen such objects as a ladder, a fence, chairs of different patterns, a garden-seat, a semaphore that worked, a summer-house with door and windows which would open, a child's swing which accommodated a small doll, a cradle, a kitchen-table, and many other models of useful articles capable of being made by young children.

The scheme appeared to be very practical, and might be regarded as one solution of the difficulty of teaching handwork in the lower standards.

THE ART SECTION "HONOURS PAGE."

AN INTERESTING COMPETITION.

IT has been said many times in these pages that one of the chief aims of teaching drawing should be to give the scholars the inherent power to see for themselves. *Instruction* is, of course, absolutely necessary in the vast majority of cases; but such instruction should always be given with a view to making the pupil dependent upon his own powers and independent of his teacher.

With a view to the development of this aim we propose to give each month an "Honours Page." This page will consist of a number of drawings similar to those shown on page 581. They may be sent by any *bona fide* scholar in primary or secondary schools. No restriction is made as to subject, size, or medium—the pupils are to have an entirely free hand, as we wish to develop spontaneous and independent work. Though not essential, the drawings should, as far as possible, be done out of school hours—or, rather, perhaps outside the four walls of the school.

The illustrations will show the character of the work suggested. Nos. 1 and 2 are spontaneous drawings from pupils in an infants' school; Nos. 3 and 4 are outdoor sketches by older pupils; Nos. 5 and 6 are imaginative drawings reminiscent of Hallowe'en; Nos. 7, 8, and 9 are sketches made from objects in museums in connection with the Glasgow Corporation competition, a report of which appeared in a recent issue. All the drawings are considerably reduced in size.

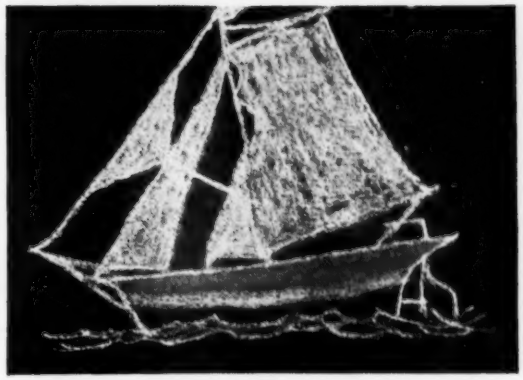
Teachers may suggest to pupils what subjects it would be advisable for them to do, but should give no help beyond this. Boats, ships, bridges, houses, doorways, school corridors, stiles, gates, farm implements, barrows, carts, trams, street lamps, toys, birds, animals, flowers and plants with or without adaptations to pattern, shells, etc., are all available; but whatever is done must be well done, and be worked in a sound style.

Simple, interesting forms, thoroughly well executed, should be attempted rather than ambitious work beyond the capacity of the pupil. Any specially good examples done during the ordinary drawing lessons, especially when the work is free in character, will be quite eligible for sending in. Indeed, good, vigorous, honest work of whatever type, so long as it is on educational lines, will be accepted.

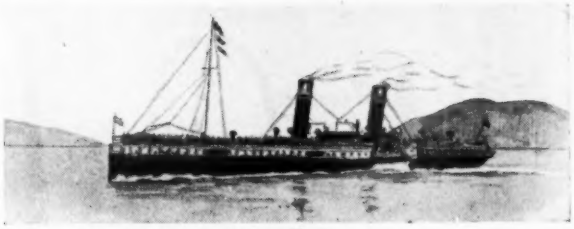
Prizes.—Though the greatest reward should be the honour of getting the drawing reproduced, yet as a permanent memento a good japanned tin box of water-colours will be presented to every pupil whose drawing appears in the "Honours Page."

Drawings may be sent in at any time. They must be *packed flat*, and marked outside, *Art Section, Honours Page.* Every drawing must be clearly marked on the back with the scholar's name, age, and full school address. They must also be countersigned by the teacher of the class, or the head teacher of the school. This signature will be accepted as a guarantee that the drawing is the *bona fide*, unaided work of the scholar whose name it bears. We cannot undertake to return the drawings not made use of.

No. 1.



No. 2.



No. 3.

No. 4.

No. 5.

No. 6.

No. 7

No. 8.

No. 9.

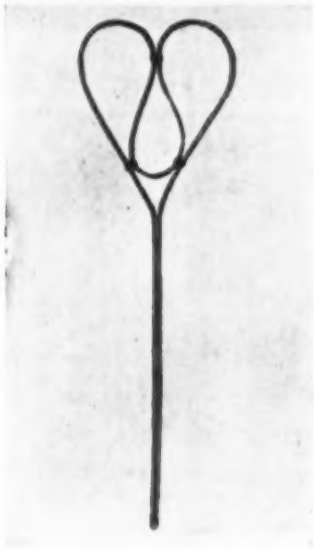
THE ART SECTION "HONOURS PAGE."

PRACTICAL DRAWING LESSONS.

CLASS III.

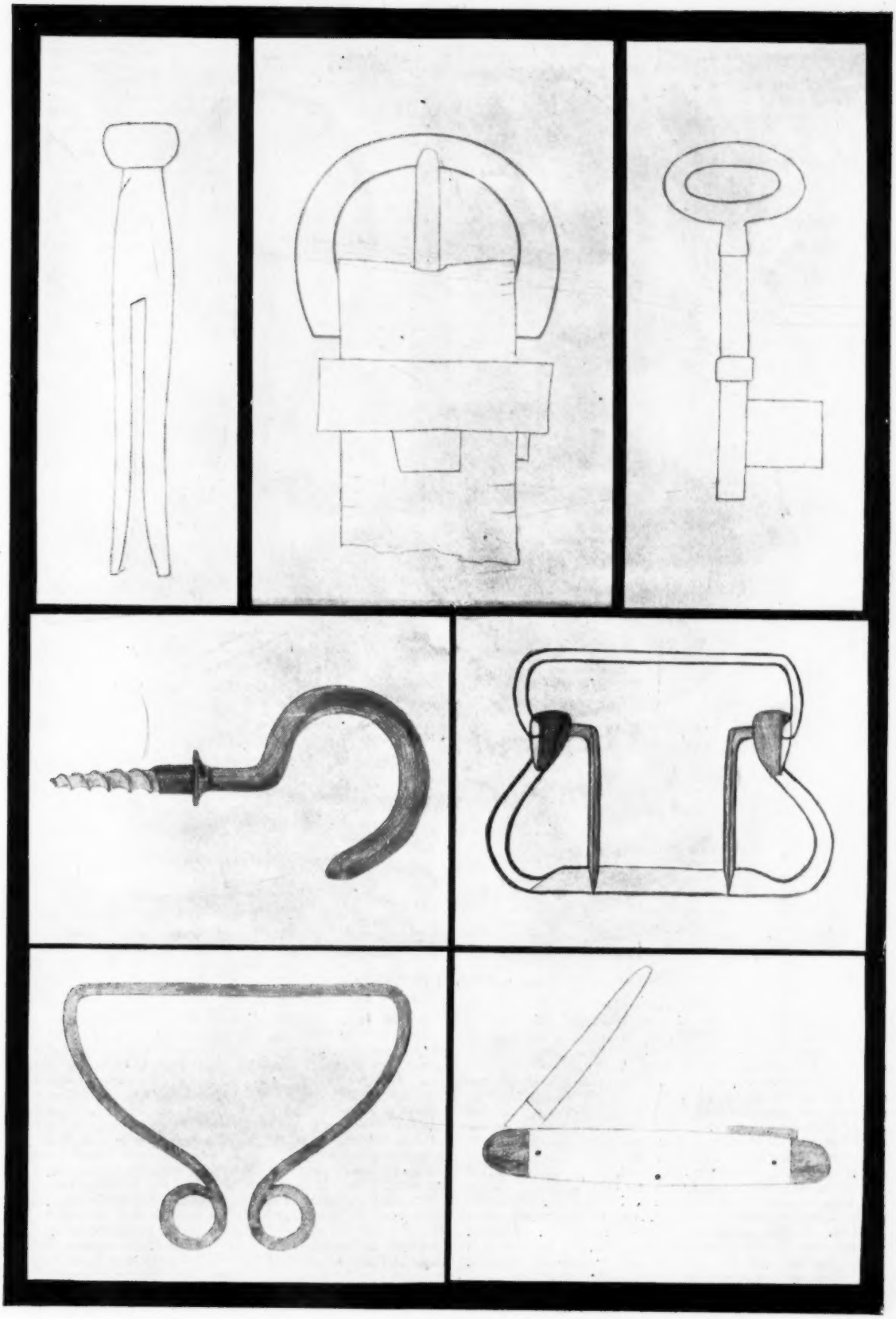
OBJECT DRAWING.

THE present article deals with the object drawing of Class III. From a glance at the illustrations it will be seen that the models are chosen from things of more complicated form than those used for Class II. The representations are also better finished than those of the younger pupils; but in other respects the lessons run on much the same lines, and no new methods of

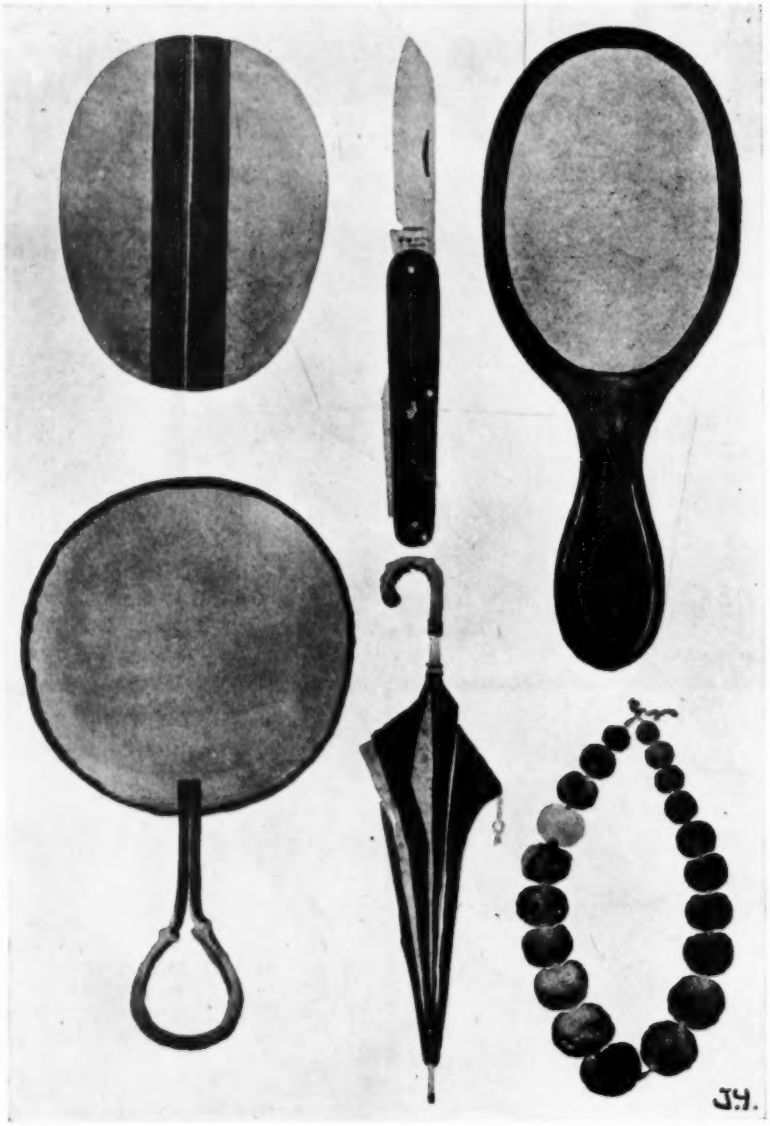


work are introduced. The drawing of the stone bottle, page 585, is an exception, and is included here as an illustration of what might be given to a pupil who was evidently ahead of his neighbours. It is an introduction to the work proper to Class IV., and in a slight degree brings in the perspective of the circle and the study of light and shade which goes to represent roundness and solidity. Referring to the drawings here reproduced, it will be seen that the objects are all placed in planes which are parallel to the paper, revealing as much as possible the actual contour, instead of the modified form which is seen when the object is viewed obliquely. It will be time enough to begin the teaching of the perspective view in Class IV. The present set of drawings are done in pencil, brush and colour, or a combination of both; and though there is no illustration from actual blackboard work, this does not mean that such work is to be dropped. Most of the examples would do equally well for small brush or pencil drawings, or for chalk drawings done to a large scale. It will be noticed that very few of them are in outline merely. It should be the aim more and more to approach the full representation of things, adding the light and shade effect if working in chalk or pencil, and also colour if working with the brush. I advised the retention of blackboard drawing in the scheme, but I would still more strongly advise the continuation of exercises in drawing in outline. The care and searching necessary to make an outline drawing which is at once correct and convincing is an invaluable study at any period of the curriculum, so that it will be a healthy change in the study of tone and colour to go back occasionally to pure outline. The tendency to looseness and untidiness, which is fairly prevalent, may be checked in this way.

The study of tone values, of colour, and of light is necessary to complete pictorial representation, and must be attempted sooner or later. There is no doubt that such study will stimu-



OBJECT DRAWING.



OBJECT DRAWING IN COLOUR.

late interest in the work, and give an additional value to the training which the pupil receives. It is difficult, however, to get young pupils to compare and reason upon their visual impressions when dealing with all those subjects taken together as we find them in natural objects. They fail to see the connection between light and shade and the drawing of form, between tone values and apparent colour changes upon planes that are evidently of the same colour. Yet if these various facts are not truly stated and all in thorough agreement in any drawing, it will be of very little value. Besides all this there is the mechanical difficulty of putting on the colour or shade in clean, flat, or graded tints, and this must be led up to gradually. Taking such models as a knife, clothes-pin, or belt buckle, where the spaces to be covered are not too large, is a good way to introduce the subject. In the case of the clothes-pin, which is, of course, all one material and its surface all one colour, yet because it is a round thing the light does not fall equally upon all its parts, and the under side of it appears much darker than the upper side, which is in full light. The average child's attempt to render this will be at first a pencil tone, or a wash of colour which is equal all over. The attention of the children should be carefully drawn to this, and the various methods of rendering it should be illustrated on the blackboard, or on a large sheet of paper, before the whole class. It is easy to show the children that something more than a flat tone is necessary if the drawings are to look like the real objects, and not like flat ones cut out of one coloured paper and pasted on another. And so, in the case of the knife and belt buckle, objects which are composed of different materials, the most one gets from a beginner is a new tone to represent the colour change of the material, and no notice is taken of the fact that round surfaces do not look equal all over, while flat ones generally do. We meet the same difficulty when the study of colour is begun. The pupils may imitate with a fair amount of accuracy the local tints of the object; but to put on a wash of one or more colours so graded as to represent the light and shade as well as the hue of the surface seems a difficult thing for most of them to understand or to accomplish. Success may be attained, however, with plenty of practice, and repeated efforts must be made with simple, well-chosen exercises, similar to those illustrated on page 583. As a matter of expedi-

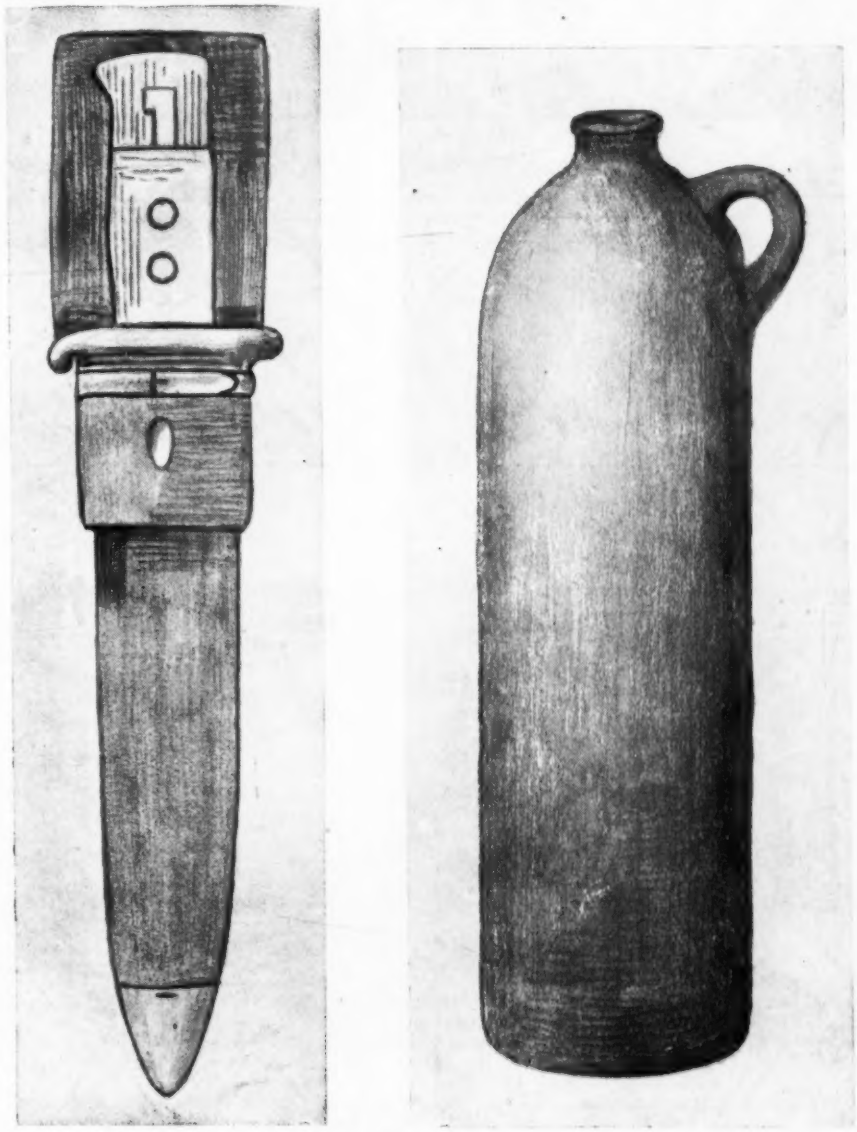
ency, and for the sake of analysis, it is a good plan to let the children colour some of their shaded drawings. In this case, very little more than the flat tint is required for a complete effect. Of course it is better to produce the shade effect directly with brush and colour; but the above experiment is worth trying, as it may be the means of clearing up certain difficulties.

It should not be necessary to point out that in the case of lessons from models such as the key, hook, etc., it is useless to attempt to teach with only one model for the whole class. Each pupil should be provided with his own model, and though general characteristics and methods of work can be indicated to the class as a whole, individual attention is required for correction, and it is better to give this in small doses to *all* rather than too much to a few individuals only.

On page 584 the examples are all brush-work exercises. Should any of these be considered too difficult, there is no reason why a simple pencil planning or blocking outline should not be put in first, only the same model should be done again as a brush-work study without the aid of the pencil. The light wash is put in first, giving the complete mass, and the darker tones are then added when this is dry. This gives an opportunity for correction as well as the mere addition of detail.

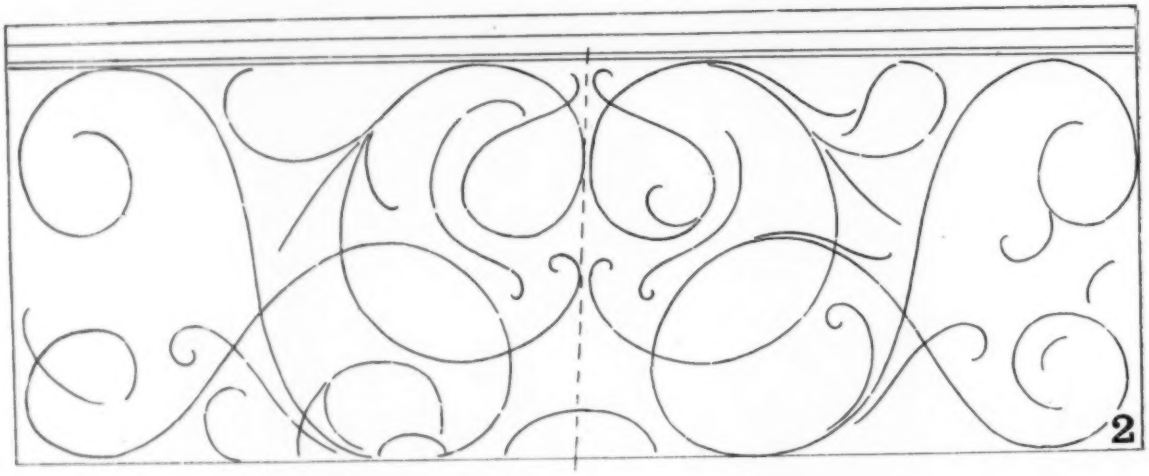
There are some fresh types in the selection of models given this month, and many of them are intimately associated with the pupils and their school life. It is always certain to arouse interest if models are chosen from the immediate surroundings of the school or home, but the things selected should be of good form. I find that boys generally carry a good number of things that are suitable, and if they are allowed once in a while to chose their model from their own pocket, they will work very hard at that and think it fun.

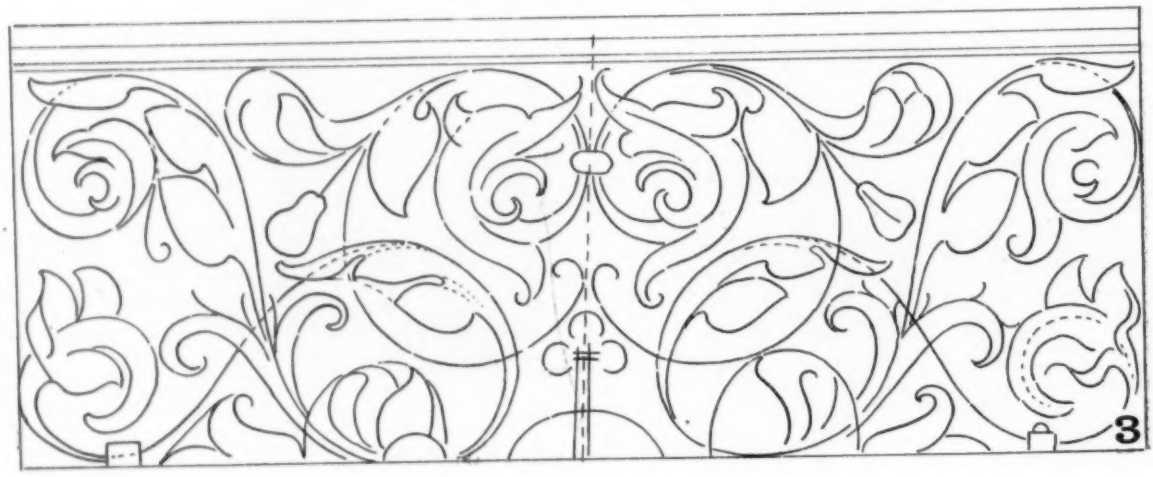
Object drawing should be taken regularly throughout the year, but perhaps in the winter months more of it would be given than of nature drawing, when it is difficult to secure specimens. It is important to give frequent memory exercises in drawing from objects, and the teacher ought to select the object to be drawn, and indicate the particular view, and how it is to be treated. Careful criticism, and, if possible, comparison of the finished drawing with the object itself, must follow a memory lesson if the full benefit is to be derived from this study.

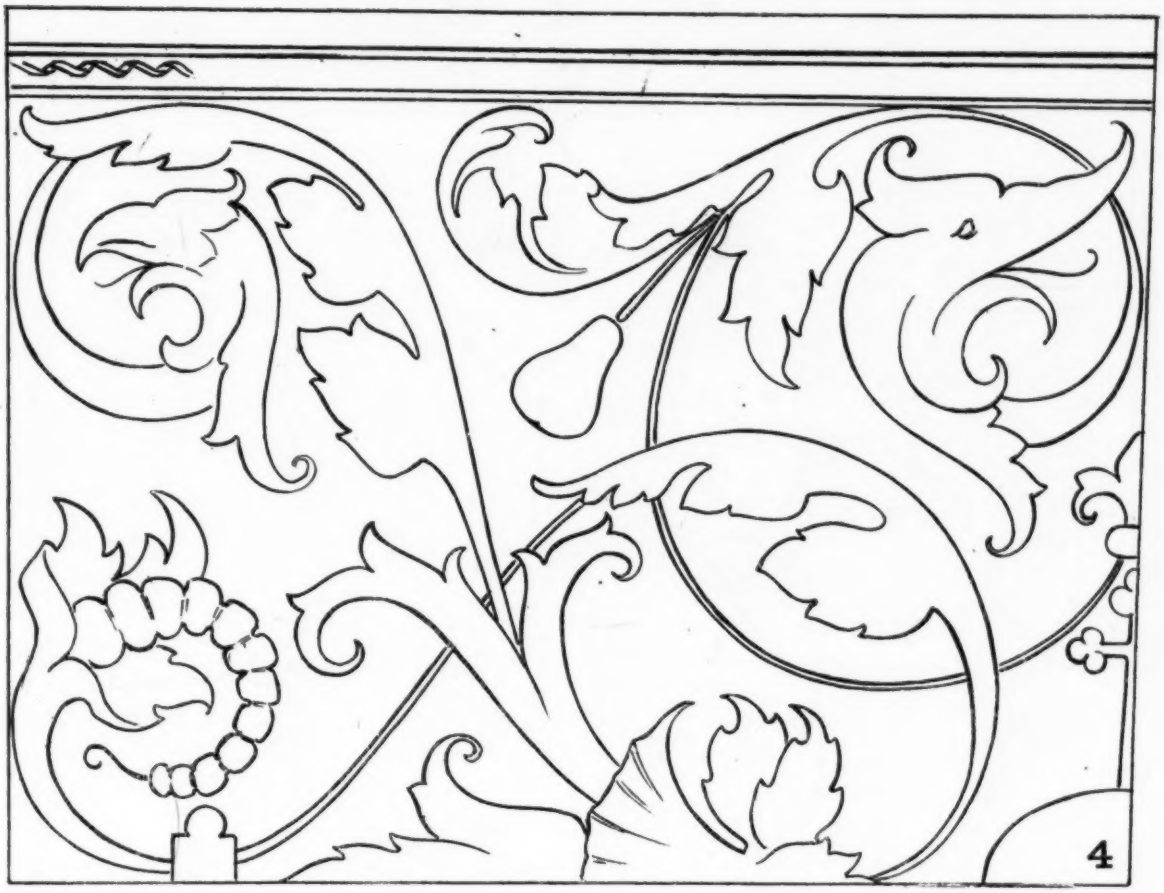


OBJECT DRAWING IN SIMPLE LIGHT AND SHADE.

BOARD OF EDUCATION—EXAMINATION IN FREEHAND.—IV.







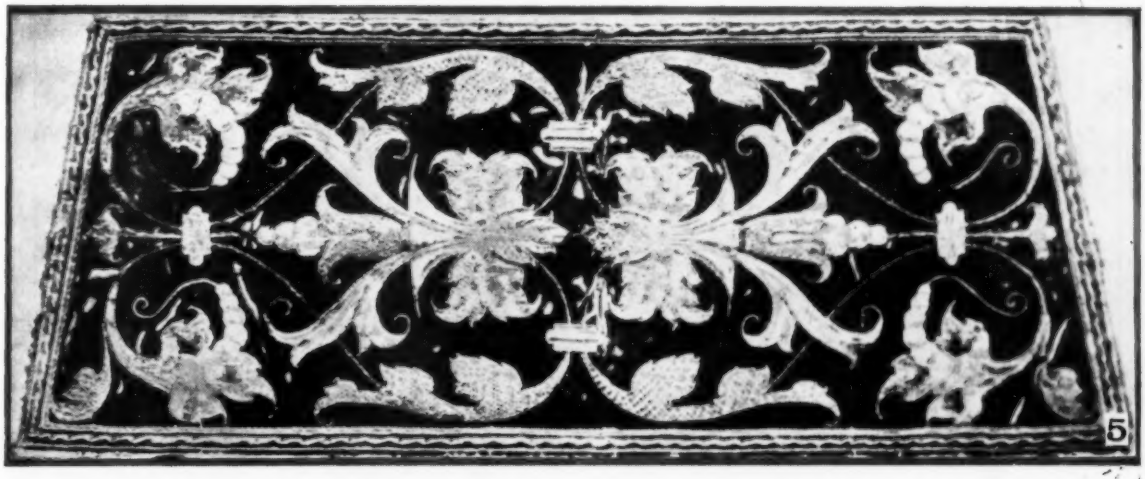
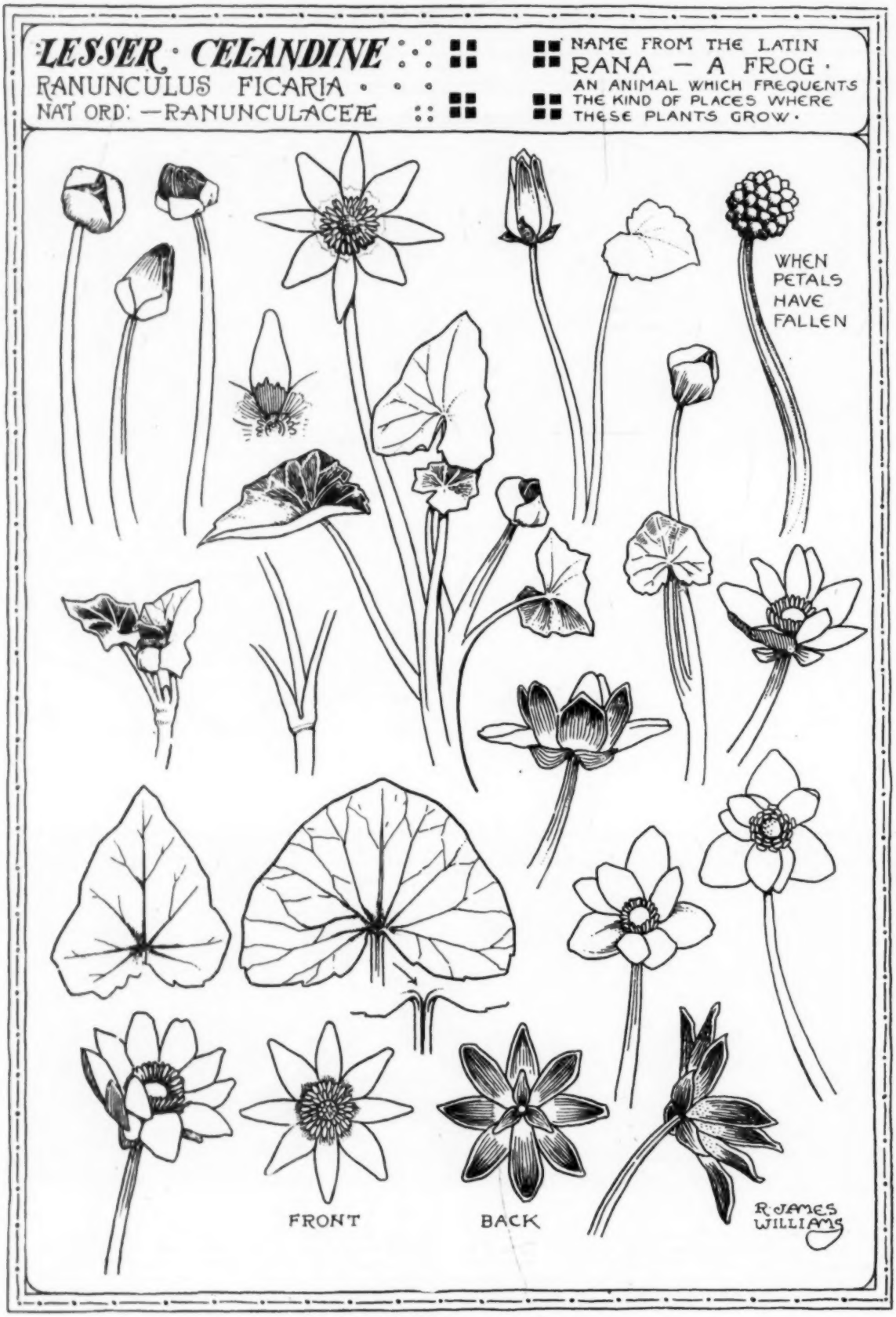


FIG. 1 is a reproduction of the test of June 1904. The leading lines of the composition are shown in Fig. 2, and the analysis of the ornament in Fig. 3, while Fig. 4 shows half the pattern to a larger scale finished with a pencil outline. The instructions given with the preceding examples apply with equal force to this, the concluding one of the series. Fig. 5, set at the evening examination of the same year, should be analysed and finished by the student without assistance as a test of his progress.

W. R. B.



FLOWER STUDIES FROM NATURE.

CARDBOARD MODELLING FOR JUNIORS.

BY FELIX T. KINGSTON, BARRY.

Model No. 9.—A Packet.

THE child may begin this exercise by being allowed first to examine a completed specimen, and then to construct the development or working drawing for himself. This attempt at discovery will lend an added interest to the work by arousing

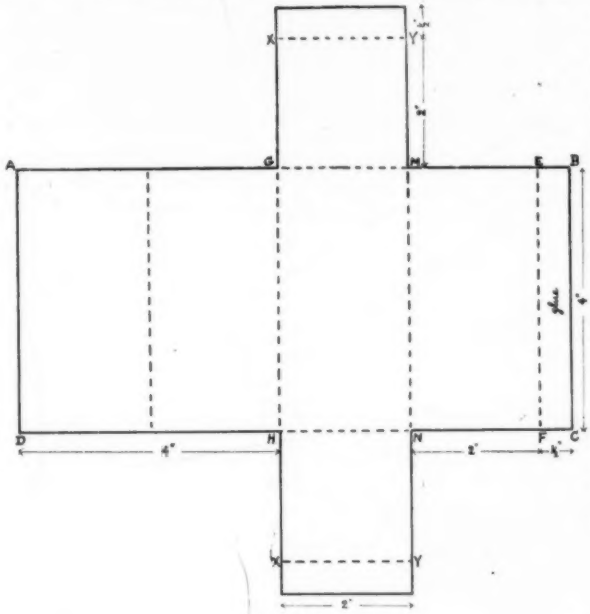


Fig. 15.

curiosity, and will bring the powers of observation into full play. Each successful effort will strengthen the inventive faculty, and form a step towards the designing of models wholly by the child.

Any other model may be commenced in the same way, provided it is not over-elaborate in detail of construction.

Or the model may be commenced thus:—Show a finished specimen to the class. Let them count its faces, estimate the lengths of its edges, and correct their results by actually measuring the model. A little arithmetical work will follow—for example, finding the area of each face, the total area of all the faces, how many times one rectangular face is larger than the square top. Cut out six pieces of paper to fit the faces of the model. Let the class try to arrange them (say by pinning them to the blackboard) side by side in such a position as to form the development of the model. Finish by asking for suggestions as to position of any flaps required.

In this way the children may be led to construct occasionally the working drawing for themselves.

Draw the rectangle ABCD, $8\frac{1}{2}'' \times 4''$ (Fig. 15). Draw EF $\frac{1}{2}''$ from BC to form a flap. Divide the remaining rectangle AEFD vertically into four equal parts to form the large faces of the packet—an exercise in drawing vertical parallel lines with the set-square. Produce the lines GH, MN, $2\frac{1}{2}''$ in both directions, and complete as shown. As the figure is somewhat larger than those previously drawn, and is therefore more apt to get out of shape, it must be rigorously tested by the pupil before proceeding further.

Cut out the figure with the scissors. In cutting out the corners—for example, BMY—after cutting inwards from B to M, cut *also inwards* from Y to M. It is impossible to obtain accuracy at G, H, M, N by cutting *outwards* from these points.

Score the dotted lines, taking special care of the lines GM, HN, XY. These must be parallel to one another, and even if correctly drawn may nevertheless be incorrectly scored. Errors in scoring GM, HN can be avoided by seeing that the ruler lies along the whole of the line AB. Similarly, in scoring the line GH the child must place the ruler from X to X, and not confine his attention merely to the part GH when putting the ruler into position.

Glue the flap BC, and fasten it inside the model at AB, so that the lines AD, EF meet and form one edge. In neat and clean work it will not be possible, except by careful scrutiny, to distinguish this edge from the others.

The flaps at XY are not to be glued, but merely folded in (Fig. 16), so that the packet can be opened at both ends.

Model No. 10.—A Basket.

The drawing (Fig. 17) will be recognised as a variation of the square tray (Model No. 6), and this model, minus the handle, can be made up as a rectangular tray.

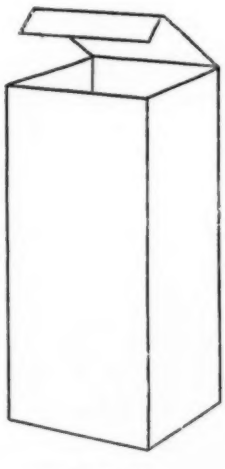


Fig. 16.

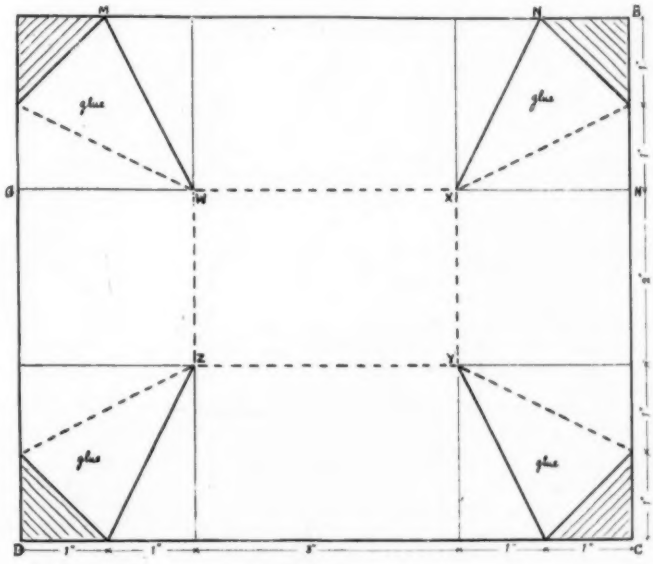


Fig. 17.

In this connection another word may be said concerning original work. The child may take a further step in design by thus varying a model previously made, just as in the ordinary drawing lesson a child may rearrange according to his own ideas the units of a pattern which has been given him by the teacher. At each succeeding attempt the teacher's assistance is lessened,

and the child gradually acquires power to create for himself. If, on the other hand, he is confronted with the whole problem of original design at the first attempt, the result will certainly be "original"—and ludicrous. Unless, however, some original work is included in a course of manual occupation, a valuable part of the training it affords is lost.

For the construction of the basket see directions for No. 6.

Too much care cannot be bestowed on the accurate drawing and scoring of the rectangle WXYZ which forms the bottom of the basket, for it is just here that mistakes are most likely to arise. Before fixing, mark off on the sides of the basket the position of the handle. The shaded portions at the corners (Fig. 17) may be cut off after gluing.

A strip 8″ × 1″ will be required for the handle. Mark off ½″ at each end, glue and fix to the outside of the basket.

The completed model is shown in Fig. 18.

An increase in the amount of gluing will be observed in this

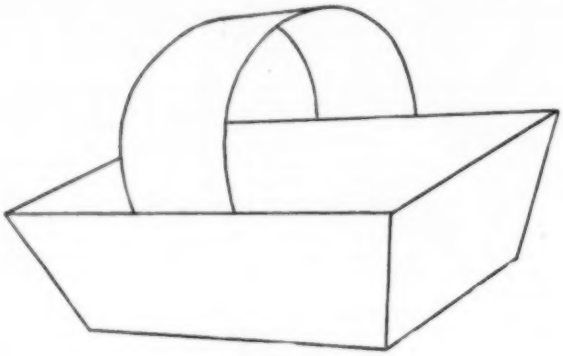


FIG. 18.

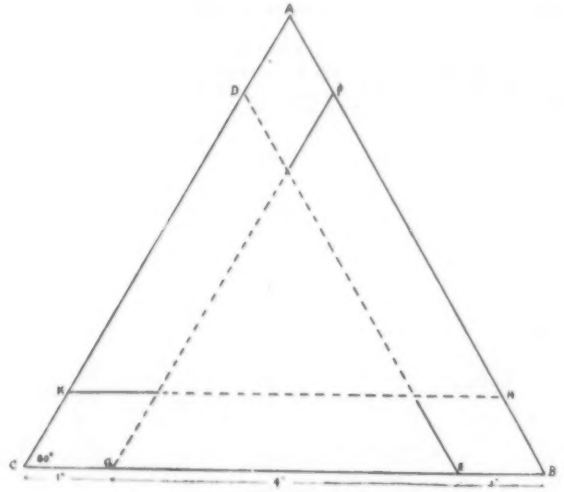


FIG. 19.

exercise, calling for much care and patience. Throughout the course there is a gradual growth in the amount of application demanded of the scholar, each added difficulty being great enough to exact the exercise of the pupil's whole capacity, and yet not so great as to bring inevitable failure.

MODEL NO. 11.—A TRAY.

This exercise introduces the equilateral triangle, with which by this time the children will have become familiar in their drawing lessons.

Make the triangle ABC (Fig. 19), 6″ side, using either the 60° set-square or the compass. Mark off the points D, F, etc., 1″ from the corners, and join DE, etc.

Cut out along the thickened lines, and score the dotted lines.

Fix the flaps on the outside, and cut away the shaded parts at the corners of the triangle (Fig. 19).

The finished model appears in Fig. 20.

MODEL NO. 12.—A FANCY BOX.

Draw the square ABCD, 6″ side (Fig. 21), with diagonals.

Inscribe the square EFGH, and join the points thus obtained to form the square WXYZ.

The pupils may here be given some practice in the observation of form—for example, finding how many squares there are in the figure, how many half-squares, how many right angles, what lines are parallel or perpendicular to one another. They will be led to see that the square EFGH is one-half of the whole figure, while WXYZ is one-fourth. Such simple calculations will facilitate future work in geometry and mensuration.

Cut out the square ABCD, and then cut along the lines AW, BX, etc., taking care not to go beyond the corners of the inmost square. The shaded portions of the triangles AWH, BXF, etc., may be cut away, leaving strips about ½″ wide for gluing the model together.

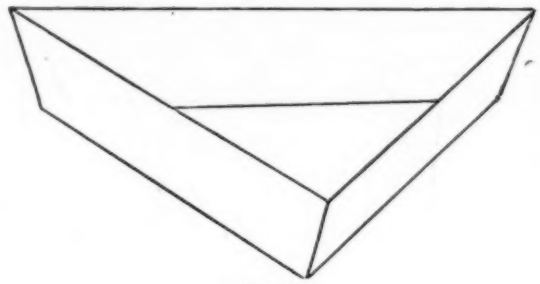


FIG. 20.

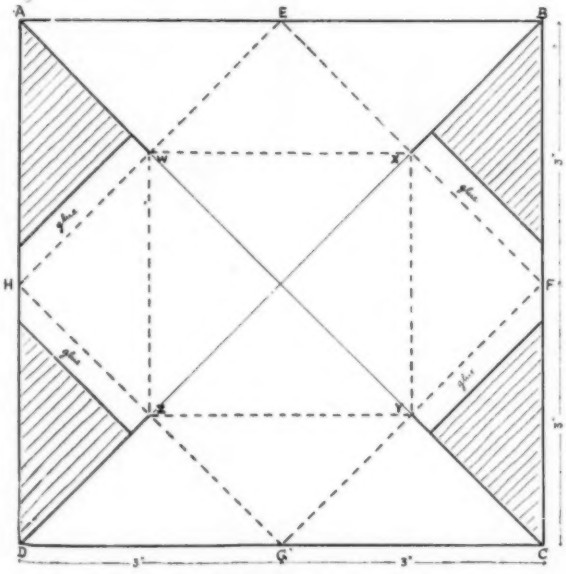


FIG. 21.

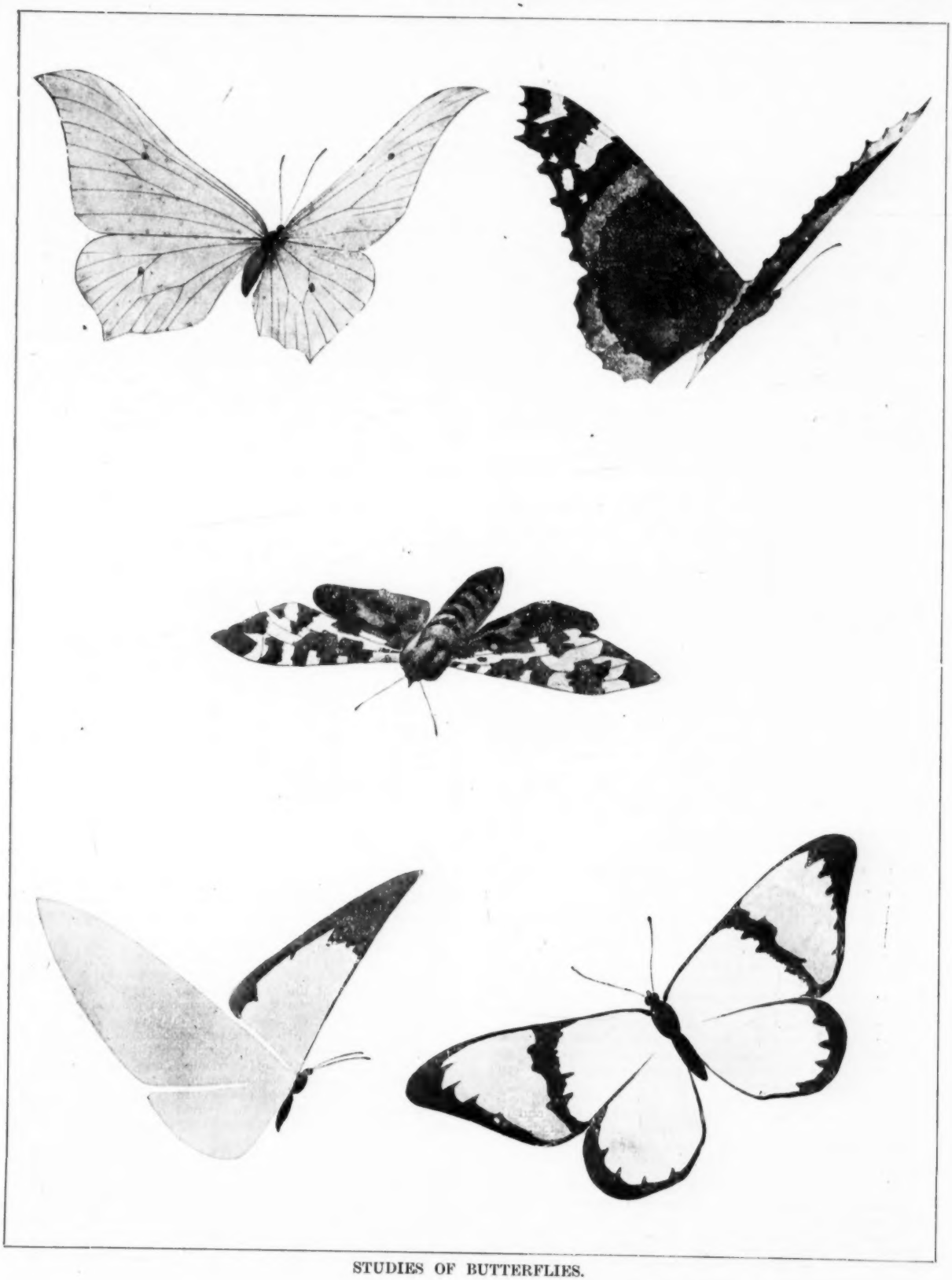
In scoring, begin with the square EFGH.

Before gluing, fold the paper along the scored lines to ascertain where the flaps must be fastened, and to gain an idea of what the finished model looks like. If any lines are insufficiently scored, there is now an opportunity to run the point of the scissors over them again, for it is important that they should all be scored to the same depth.

To glue the model, lay it flat on a piece of newspaper and scrape a thin coating over the flaps. In fixing, bring the flap FX under the edge BX, etc.

It will be instructive to the child to compare the finished model with the drawing, to point out the corresponding parts of both. This will add concreteness to the drawing. Thus the square WXYZ, which geometrically is an abstraction, has become a *thing*—namely, the bottom of a box.

At this stage pupils who are more advanced in their work may be given an extra model to make while the backward ones



STUDIES OF BUTTERFLIES.

are levelling up. Such a model will serve as a test of the work done up to this point, and will at the same time set the teacher free to devote more attention to the slower pupils. The extra model might well take the form of something designed wholly by the pupil, or some object embodying the suggestions of several pupils. In any case, it should be simple enough to admit of neat and accurate execution.

THE TEACHING OF DRAWING IN SECONDARY SCHOOLS.

AN important and interesting exhibition of drawings done in girls' high schools was held recently at the Board of Education Buildings, South Kensington, kindly lent for the occasion by the Board of Education. It was arranged by the directors of the Girls' Public Day School Trust. One very noticeable feature of this exhibition was the condition imposed by the directors, that in all cases the class exhibits were to include every drawing done in the class, whether good or bad. As a consequence the drawings shown did not represent the work of the talented children alone, but included the work of every scholar present on the day when any particular lesson was given.

A very useful arrangement was the labelling of each set of drawings, with the number of children in each class, and the time allowed for the exercises.

This system revealed the fact that the satisfactory results shown were obtained by means of a very small number of pupils in each class.

Taking the work done in the Blackheath High School as typical of the work done generally in the schools belonging to the Trust, the scheme of drawing showed that in the preparatory class the principal work done was drawing in mass with the brush. This was usually done on black paper with Chinese white or other body colour. Thus, in the nature drawing the snowdrop, marguerite, and cowslip were shown; also complete plants of the strawberry and daisy, leaves, flowers, and roots being drawn directly with the brush. The time allowed was twenty minutes for each lesson.

In the Lower II. this nature work was added to by the drawing of simple flat objects, also with the brush. An artist's palette, with its gorgeous daubs of colour, was one conspicuous example. Memory drawing was also included, one test being a quill pen and lead pencil, drawn in coloured crayons after one look at the objects. In the Upper II. the brush drawing was further developed. A radish with its leaves, a blossom of laburnum, a spray of blackberries with leaves, and another of hawthorn, formed part of a course of nature drawing for girls of eleven years old. Original illustrations in this form were shown, drawn from memory as home work. Pencil sketches of "A Nurse and Baby in the Park," "A Windy Day" (lady with an umbrella struggling against the wind), and other similar subjects indicated the power of observation possessed by the children. In the same class the objects drawn included a Japanese lantern, sketched lightly in pencil and tinted in water-colour, the gradations of colour and the brush-drawn ornament being well attempted. This was done in two lessons of thirty-five minutes each.

In the Lower III. form the brush drawing showed considerable advance in technique, the sprays of blackberry leaves showing a very direct, bold treatment. The colour also was much improved. A little higher in the school the plan of giving three similar objects in different positions was adopted. For instance, three flower-pots standing on a drawing-board and three dust-pans illustrated this method of teaching model drawing. The flower-pots, of the same size, were placed in a row at different distances from the eye, so that they clearly showed the effect of distance on the apparent size of the pots. A pair of boots also provided an excellent example of objects delicately shaded in pencil.

Another idea was to sketch such objects as a large Spanish onion and an oil-flask in pencil, lightly shade them, and then add slight touches of colour with crayon, the local colour of the objects being thus suggested.

A class of thirteen girls showed considerable skill in drawing an old carved chair, afterwards shading it in pencil. A curious feature was the filling up of the background from memory or imagination. Suggestions of picture-covered walls, windows, and bookcases were in this way very lightly indicated.

Another object which gave good practice was a wash-hand stand placed on a drawing-board. The eye-level was about half-way up the stand, so that the under surface of the top was seen. Another interesting experiment was the sketching of white mice "from sight." A rabbit also was employed for this elementary "study from the life." The various positions of the animals were indicated by a few telling lines, no details being put in—a difficult class subject when the inevitable movement of the animals is taken into consideration.

A valuable study in tone values was done by a class of nine, whose average age was 14½ years. A closed umbrella was placed on a portmanteau, with a piece of light drapery falling in folds over its side. For the same purpose a black bottle and a piece of a loaf were drawn and painted in water-colour.

Passing now to the upper forms, a course of shading in sepia was introduced. A wine-flagon and roll of paper lying on a book, a basket containing a bottle, with a corner of white cloth as a contrast in tone, were strong groups that showed most effectively striking contrasts of texture and tone.

Another piece of strong work was accomplished in two lessons of eighty minutes each by a class of thirteen girls (age seventeen). A glazed jug, full of rich, transparent colour and strong reflections, was standing on a table, with one large pear and a portion of another. The difference in texture between the cut surface of the fruit and the polished skin was well shown. Studies of green and white drapery hanging over the back of a chair also produced a very good set of exercises in colour and tone.

The girls were encouraged to apply their designs to some practical purpose. Original designs were thus carried out in various materials—a table-centre, for instance, in which the pattern was produced by an arrangement of the flower, leaves, and seed-pods of the wild rose; and a painted cushion cover, where the pattern was based on the nasturtium.

In addition to these examples of the complete course of class drawing, there were exhibited various well-executed drawings of the work of the special art class, consisting mostly of studies of still life in water-colour. A powerful drawing of Rembrandtesque effect was noticeable in this section: a lighted candle, burning in an ancient, rusty lantern, cast strong, picturesque shadows all around, revealing a churchwarden pipe and boxes of matches as accessories. Specimens of work done in the life class were also shown, the most conspicuous being various studies of an old countryman in an elaborate smock.

Similar schemes of work were sent in by various high schools throughout England.

The difficulty of drawing perspective views of objects in the lower forms has been fully recognised in many schools, and exercises have been chosen involving the use of flat objects without the necessity of foreshortening. Children's toys figure largely in this part of the scheme—a kite, a trumpet, hoop and stick, a wooden spade, a ball of wool with knitting-needles, and a tennis racket being among the articles selected for these early lessons. A feature of the exhibit sent by the Wimbledon High School was the set of illustrated calendars shown, which were designed by the different forms throughout the school. Each of the twelve months were thus illustrated on the same general lines, and the most suitable examples were then selected for the final design. Thus at the top of each design was a landscape illustrating the characteristics of each month: for February, lambs playing in a meadow, with a border of crocuses. In the August calendar a cornfield was shown, with a border of wild clematis and blackberries; and so on for each month. A suitable poetical quotation was also selected, the search for these extracts from the standard poets being an admirable literary exercise, which shows the possibility of co-ordinating the ordinary school subjects with the scheme of drawing.

The scheme of drawing sent in by the Clapham High School showed a very complete course of work, from the simple brush drawing of the preparatory class to the highly-finished certificate works of the students in training at that important school. A valuable insight into the thorough course of art training gone through by the students, under the able direction of Miss Welch, was afforded by an examination of the notebooks of the students. Each drawing lesson was evidently prepared with as much care as the other subjects of the school curriculum, and was keenly criticised by the art mistress. Such thorough preparation of the lesson, and the careful study of the methods to be employed, explain in a great measure the good work done in the schools which were supplied with art teachers from this valuable training school.

To the casual visitor the exhibits were probably somewhat disappointing in their unevenness; but bearing in mind the conditions imposed and the method of arrangement, the educational value of such an exhibition is undoubtedly great, both as an illustration of what can be done with *small classes* of intelligent children under the instruction of specially trained teachers, and also as a promise of what may be accomplished in the future, when the importance of drawing as a recognised subject of instruction in public schools is more fully understood.

THE NEW ENGLISH MOVEMENT.

HINTS FROM AMERICA.

BY W. H. WINCH, M.A.

A COPY of the Chicago *Tribune* now lying before me contains the following verse :—

"'Blood is thinner
Than water,'
Says the good Bish-
Op Potter."

An Englishman cannot find the rhyme, but it is there for the American. Americans say that we pronounce the word "water" as if it were written "warter;" we retort that they pronounce it "wotter." They gird at our pronunciation of the word "can't," and say we call it "cawn't;" we laugh at their pronunciation, which is "căn't," with a short "a" as in "cat." Nor is it easy for an Englishman to accustom himself to "dooty" for "duty." And of differently accented words, as "prim'-arily" for "pri'marily," there are a few; and of different spellings there are a few, as "thro" for "through."

In the West of England, at Bridgnorth Station, I recently heard a boy call "Paper." The clear, pure "a" and the final burr, as the boy said "Pay-purr," transported me suddenly to Chicago; and then I passed in thought from the burr of the West to the broader "a's" of Boston and the slurred "r's" of New York, with that peculiar diphthongal sound which is used for "o" when followed by "r," as in "word." I cannot easily express this sound. In various New York schools, listening to the children reading, I wrote it down, sometimes as "oy" (thus "woyd" for "word"), sometimes as "ei" (thus "weird" for "word"). It is probably, as Mr. G. B. Shaw says (I think in the preface to *The Devil's Disciple*), nearer to the French "eu" or the German "ü" than any other sound of English-speaking peoples. Then there is the East-side dialect. "De udder bloke gimme it," I heard a Bowery boy say in explaining away a charge of theft; and the language, as well as the reason given, made me think of home.

Then, of course, there is America's great problem, to which we have no parallel whatever. Tens of thousands of immigrants pour in weekly—no longer the bone, brain, and sinew from the leading countries of the Old World, but the surplus populations of Central Europe, in a very low state of development both as to civilisation and language. Should we be surprised, then, that America shows some dialectical diversities, and that its English is not one and indivisible?

It is profitable to compare for a moment some of our own peculiarities. A Yorkshireman and a man from Somerset would converse with difficulty; and I, personally, know no set of English vocables more degraded than those of our own Cockney speech.

An educated Englishman can understand easily and be easily understood in any part of America. Can this be said of all parts of England?

Whether our insular vanity will allow us to realise it or not, I for one am perfectly willing to concede the American's claim—namely, that his difficulties are greater, and that his English results are better, than those of England. We fail to recognise his merits mainly because he pronounces a few English words differently from ourselves. (Lowell has rightly corrected us for saying "to ourselves.") And he sometimes makes queer recommendations about spelling, we think. But we quite mistake if we allow these things, or a few highly-spiced dramatic fluencies, to lead us to suppose that the American does not care for and revere the English language. He has risen to the task partly from the very magnitude of the problem. Just as in the newly-created German Empire the schools are aiming to eradicate geographical varieties of speech, so that there shall no longer be Prussian and Saxon and Bavarian dialects, but one German tongue of one united Fatherland, so in America the great school system devotes itself to unification. Its children come in as Germans, Swedes, Italians, Poles, Russians, Roumanians, and what not; they have to be turned into good Americans. There are those who say that in character they do not become Americans, and since the old Yankee population is dying down this is a very serious matter. But there is no doubt at all that in the use of the English tongue they do become proficient, and in that respect are as American, or as English, as any one can desire. And they leave off speaking the tongue of their mothers and fathers: I am not sure that they do not come to despise it as something very un-American.

How is all this done? How is it that America, starting out with more than our difficulties, arrives at results better than our own, with an interest in English literature more widely spread than among the English themselves?

These articles will try to show some of the causes at work—not by general statements merely, but by the actual lessons given, the actual methods of teaching adopted, and the actual results of work done for me. My visits to the schools were unexpected, and were made partly to schools selected for me, and partly to schools selected haphazard by myself.

But first and foremost, above all questions of school method, is the question of national ideal. The American's classics are English. He has never regarded a knowledge of the treasures of Greece and Rome as superseding the necessity for the careful cultivation of his mother-tongue. He is desirous that the children attending his schools shall acquire a good store of first-rate poetry and prose which, even if they learn no more after leaving school, may abide with them in after-life.

Like the German Imperialist, he teaches in his schools his national songs and his national literature.

Even the pupils of Grade I., which children enter when they reach six years of age, are required to memorise much poetry. The New York syllabus says: "At least four lines of poetry per week, or an equivalent amount of prose, should be memorised by every pupil."

"But surely we do these things too," I hear an English teacher exclaim. But are there no schools at home where a national song is never heard? Are there no schools in which the great English poets are unknown? And in others, how much is done?

I suggested to one teacher in Chicago that if there was any disproportion in the time-tables which I had seen, it was, perhaps, that very much time was given to English. She replied, very frigidly, that too much time could not possibly be given to it. In her city, reading alone occupied 9 hours weekly in Grades I. and II.; and even in Grade VIII. (the highest grade) 3 hours 20 minutes were given weekly. In addition to this, 1 hour 40 minutes were given in Grades I., II., and III., increasing up to 3 hours in Grade VIII., to dictation, composition, and grammar.

The New York elementary schools give in "assigned time"—that is, in time compulsorily allotted—no less than 5 hours 20 minutes weekly, even in the highest class (Grade VIII.); and in the lower standards or grades 8 hours are given.

The Boston time-table is still more favourable to English studies. In Grade I., the children of which average in this city between six and seven years of age at the end of the educational year, no less than 15 hours weekly are given. The work in the primary schools is divided into reading (with an average of 9 hours weekly), oral exercises in language (1 hour 40 minutes weekly), and written exercises in language (1 hour 40 minutes weekly). In the senior or grammar schools English maintains the same dominant position. Even Grade IX. (there are nine grades in Boston) gives 7 hours 15 minutes weekly to the subject.

Nor must it be thought that this attention to English studies is merely a feature of the great cities. Not to multiply examples unduly, I give one more only, this time of a comparatively small city in Wisconsin. Here, in Milwaukee, the English work is divided into—(1) reading (with 7 hours 30 minutes in Grade I., and 1 hour 40 minutes in Grade VIII.); (2) language (1 hour 40 minutes in Grade I., increasing to 3 hours 45 minutes in Grade VIII.); and (3) spelling (1 hour 40 minutes in Grade I., to 50 minutes weekly in Grade VIII.).

And in none of the above time-tables is writing included under any of these heads. Separate time is in every case allotted to it.

In this preponderant time given to the native tongue America shows a strong resemblance to Germany and the very strongest difference from England. I need hardly give English time-tables to English teachers—they will know how very, very different our own time-tables are; and if we measure our respect by the time we give to teaching it, how much less regard we have for the English tongue. I mention only that the official regulations for higher-grade schools in London require in the upper grades 3¼ hours only for all English studies combined.

An American child usually enters Grade I. when he attains the age of six years, and begins at once to work at English. If he has been to school before—which is rather unlikely—he has been in a kindergarten, and has learnt no reading there. But he begins now in all seriousness. There is no considerable party in America, as there is among us, which inscribes upon its banner the postponement of reading as a pedagogical ideal. As soon as he can read, a child is supposed to do independent work—the glory of the American system—and consequently, as that is the goal or rather the very essence of the educational process, every effort is made to help the child forward in his reading. And what does he read? At first, of course, he reads school books—primers and first readers—but later on, again like the Germans, he reads extracts in prose and verse from the best authors. (*To be continued.*)

THE TEACHING OF HISTORY.

(*Continued from p. 495.*)

A LITTLE girl was once the unwilling recipient of a homily on the Ancient Britons, intended to be both informative and moral, the teacher being her own mother. "They were very rude people, my dear, and ate their meat without knives and forks. Besides, they wore very little clothing; but, of course, that was a *very* long time ago." "Of course, mamma," said the pupil. "Was it when *you* were a little girl?"

The time sense in young children is non-existent. Here psychology agrees with ordinary common sense. But it is one of the first duties of the history teacher to set about the development of this faculty, and he or she will find some useful hints on the subject on page 5 of the Scottish *Memorandum on the Teaching of History*, to which we made some reference in our last issue. For example:—

"What is needed is that the time relations should receive a vivid and enduring representation in *space*. This may be secured by constructing a chart or continuous band, divided to represent centuries or half-centuries."

"What is essential to begin with is that the child should have continually before him a *space* representation of the whole period of history that he is to be concerned with."

Excellent, too, are the remarks on the introduction of the idea of cause and effect. For example:—

"From the beginning the teacher must strive after some thread of connection, over and above the chronological, between the events with which he deals."

How our school historians, eminent and otherwise, fail in this matter is evident even on a cursory perusal of their books—always the same record of disconnected events, without any attempt to show their interdependence or to what important results they led. We are given details of the constant warfare between Scotland and England up to the time of Elizabeth, but the welding together of the two kingdoms into one receives little attention. What is the central idea of the whole period between 1603 and 1688 but the struggle between the Crown and the people? What is the chief subject of the whole of British history since the Revolution of 1688 but the expansion of the nation beyond its sea-girt borders?

It is commonly said that young students cannot grasp these large issues. They cannot, indeed, if the work is overloaded with detail. But if we throw overboard Wolsey's butcher origin, his early degree, and the details of his magnificence, as well as Henry the Eighth's marital adventures and the particulars of the Field of the Cloth of Gold, we shall be able to see a little of what was really going on at that time—the increasing prestige of the upstart kingdom of England, whose rulers the head of the Holy Roman Empire refused to recognise as "royal," not only at that time but for centuries later; and the assumption by the king of that absolute power which was to prove such a dire inheritance to the Stuart line. It is quite possible to divide British history into four portions, dealing in turn with the early settlement, the unification, the political development, and the expansion of the nation; but it is very rarely done in our schools. And it cannot be done in Scottish schools if teachers blindly follow the lead of that amiable body of bailies and others who have pledged themselves to the teaching of "Scottish history for Scottish schools!" Scotland may well pray to be delivered from her patriots.

We are in entire agreement with the recommendation to "make use of the help afforded by vivid narratives, taken or adapted, as far as possible, from contemporary literature, such as Barbour, Froissart, Blind Harry, the songs of the Jacobites, etc.; by illustrations taken, also, when practicable, from contemporary drawings of dress, armour, castles, churches, cities, historical processions, etc.; by existing buildings and ruins; and by personal relics preserved in the museums." But the right use of this method requires specialists in history teaching, or at least the employment of authentic books written or edited by competent historians.

This *Memorandum* is at least a sign that we are not resting on our oars in the matter of history teaching, for which the reformer will be truly thankful.

Our Query Column.

SOLUTIONS BY A. CLEMENT JONES, M.A., PH.D., HEAD MATHEMATICAL MASTER, BRADFORD GRAMMAR SCHOOL.

RULES.

1. Each correspondent is restricted to *one* question.
2. Each query must be accompanied by the name and address of the correspondent, and the *coupon* which appears on the back wrapper of the current number of the Journal.
3. CORRESPONDENTS MUST IN ALL CASES STATE THE SOURCE FROM WHICH THEIR QUERY HAS BEEN OBTAINED.

The Editor reserves to himself the right to decline to answer any question which is, in his judgment, unsuited to the Magazine.

J. B. H.—Prove by using Taylor's theorem that

$$\tan^{-1}(x+h) = \tan^{-1}x + \frac{h}{1+x^2} - \frac{xh^2}{(1+x^2)^2} - \frac{1-3x^2}{(1+x^2)^3}\frac{h^3}{3} + \dots$$

By Taylor's theorem

$$f(x+h) = f(x) + \frac{h}{1}f'(x) + \frac{h^2}{1\cdot 2}f''(x) + \dots$$

Now here $f(x) = \tan^{-1}(x)$,

$$f'(x) = \frac{d}{dx}\{\tan^{-1}(x)\} = \frac{1}{1+x^2},$$

$$f''(x) = \frac{d}{dx}\left\{\frac{1}{1+x^2}\right\} = \frac{(-1)\,2x}{(1+x^2)^2} = \frac{-2x}{(1+x^2)^2},$$

$$f'''(x) = \frac{d}{dx}\left\{\frac{-2x}{(1+x^2)^2}\right\} = -2\left[\frac{(1+x^2)^2(1) - x2(1+x^2)2x}{(1+x^2)^4}\right]$$

$$= -2\left\{\frac{1+x^2-4x^2}{(1+x^2)^3}\right\} = \frac{-2(1-3x^2)}{(1+x^2)^3}.$$

Hence $\tan^{-1}(x+h)$

$$= \tan^{-1}x + \frac{h}{1+x^2} - \frac{xh^2}{(1+x^2)^2} - \frac{1-3x^2}{(1+x^2)^3}\frac{h^3}{3} + \dots$$

Blackburn.—Solve the equations—

$$\left.\begin{aligned} x^3 + y &= 8 \\ y^2 + x &= 18 \end{aligned}\right\}.$$

From the first of the given equations,

$$y = 8 - x^3.$$

$$\therefore y^2 = x^4 - 16x^3 + 64.$$

Hence the second of the given equations may be written

$$x^4 - 16x^3 + 64 + x - 18 = 0.$$

$$\therefore x^4 - 16x^3 + x + 46 = 0.$$

$$\therefore (x-2)(x^3 + 2x^2 - 12x - 23) = 0.$$

Hence $x - 2 = 0$, ... (1)

or, $x^3 + 2x^2 - 12x - 23 = 0$. . . . . (2)

From (1), $x = 2$.

Then from the first of the given equations, $y = 4$.

These values of x and y satisfy the second equation also.

Hence $\left.\begin{aligned} x &= 2 \\ y &= 4 \end{aligned}\right\}$ is a solution.

Student.—To find the value of c from the equation

$$l = 2ce^{\frac{a}{c}}$$

where l and a are given, put $\frac{a}{c} = x$, and show how the values of x can be obtained by the intersection of two loci. Show that no real values of x can exist unless $l > 2ae$.

Find c from the equation

$$50 = ce^{\frac{10}{c}}.$$

(London B.Sc., 1906.)

Writing x for $\frac{a}{c}$ in the equation $l = 2ce^{\frac{a}{c}}$, we have

$$\frac{l}{2a}\cdot x = e^x. \quad \dots \quad (1)$$

Hence x is obtained by the intersection of the two loci

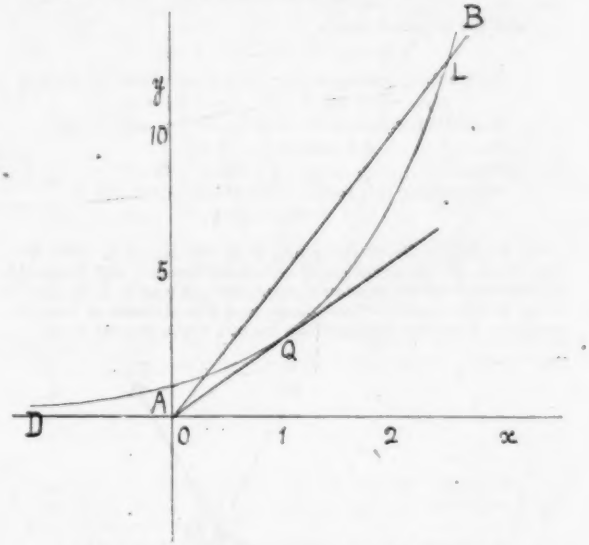
$$y = \frac{l}{2a}\cdot x, \quad \dots \quad (2)$$

and $y = e^x$, ... (3)

for it is obvious that any value of x which simultaneously satisfies (2) and (3) will satisfy (1).

Equation (3) represents the logarithmic curve shown in the figure as DAQB. (For convenience we have taken the scale for y one-fourth of that for x.)

Equation (2) represents a straight line through the origin O. (In the figure this line OL is drawn for the values of l and a given in the last equation of the question.)



It is clear that the line represented by (2) will not intersect the curve (3) in real points unless the slope of (2) is greater than the slope of the tangent OQ. Now, if (x', y') are the co-ordinates of Q, the tangent at Q is

$$(y - y') = (x - x')e^{x'}. \quad \dots \quad (4)$$

But (4) is to pass through the origin, hence we have

$$y' = x'.e^{x'}. \quad \dots \quad (5)$$

Again, since x', y' is on the curve, $y = e^x$.

$$\therefore y' = e^{x'}.$$

Then from (5) we have $x' = 1$, and $\therefore y' = e$.

The slope of the tangent OQ is therefore equal to e.

Hence, if the straight line (2) is to intersect the curve (3) in real points, we must have $\frac{l}{2a} > e$—that is, no real values of x can exist unless $l > 2ae$.

Writing x for $\frac{10}{c}$ in the equation $50 = ce^{\frac{10}{c}}$, we have

$$5x = e^x.$$

Plotting on squared paper the loci

$$y = 5x \text{ and } y = e^x,$$

the x co-ordinates of the points of intersection are seen to be about 0·25 and 2·5.

To get a nearer approximation, suppose the first value of x is $0{\cdot}25 + \eta$. Then neglecting powers of η higher than the first, we have

$$5(0{\cdot}25 + \eta) = (1 + \eta)e^{0\cdot 25}.$$

From the tables we find $e^{0\cdot 25} = 1{\cdot}28403$.

$$\therefore 5(0{\cdot}25 + \eta) = 1{\cdot}28403\,(1 + \eta).$$

Hence $\eta = 0{\cdot}0092$.

Hence the smaller value of x is approximately equal to 0·2592.

Similarly the larger value of x will be found to be approximately equal to 2·544.

Hence the two values of c which satisfy the equation

$$50 = ce^{\frac{10}{c}}$$

are approximately equal to

$$\frac{10}{0{\cdot}2592} \text{ and } \frac{10}{2{\cdot}544}.$$

A. P. (last term).—The sum of p terms of an A.P. is q, and the sum of q terms is p. Find the sum of $(p + q)$ terms.

Let a be the first term of the series and d the common difference. Since the sum of n terms of the series is

$$\frac{n}{2}(2a + \overline{n-1} \,.\, d),$$

the conditions of the problem give us

$$\frac{p}{2}(2a + \overline{p-1} \,.\, d) = q, \quad . \quad . \quad . \quad . \quad (1)$$

$$\frac{q}{2}(2a + \overline{q-1} \,.\, d) = p, \quad . \quad . \quad . \quad . \quad (2)$$

and the required sum is

$$\tfrac{1}{2}(p + q)(2a + \overline{p+q-1} \,.\, d). \quad . \quad . \quad . \quad (3)$$

Subtracting corresponding sides of equations (1) and (2),

$$a(p - q) + \tfrac{1}{2}d\{p^2 - q^2 - (p - q)\} = q - p.$$

Divide this equation through by $(p - q)$ and we find

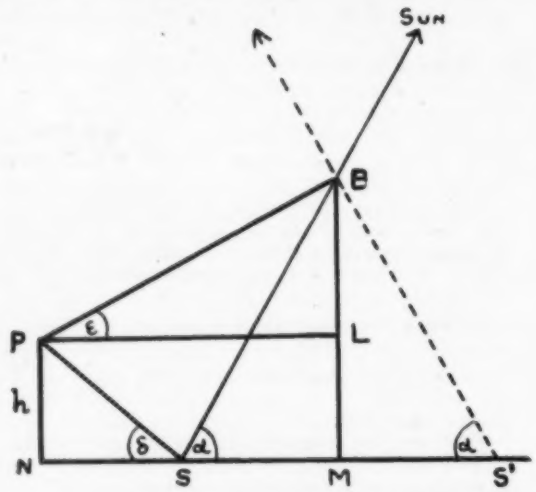
$$a + \tfrac{1}{2}d(p + q - 1) = -1;$$

that is, $$2a + (p + q - 1)d = -2.$$

Substituting this result in (3), the required sum is

$$-(p + q).$$

W. H. Edge.—From the point P at the top of a cliff h feet high the angle of elevation of a balloon B was ϵ, and the angle of depression of the shadow S upon the sea was δ, P, B, and S being in the same vertical plane, and the altitude of the sun being α. Find the height of the balloon above the sea-level.



Let the plane of the paper be the vertical plane in which P, B, and S lie. Draw BM and PN vertically to meet the horizontal line in this plane at sea-level in N and M. Draw PL horizontally to meet BM in L. Then we are given—

$$\angle BPL = \epsilon, \angle PSN = \delta, \angle BSM = \alpha, PN = h.$$

Let BM, the required height of the balloon, be x, hence

$$BL = (x - h).$$

Now since PLMN is a rectangle,

$$NS + SM = PL,$$

therefore $$h \cot \delta + x \cot \alpha = (x - h) \cot \epsilon;$$

that is, $$x(\cot \epsilon - \cot \alpha) = h(\cot \delta + \cot \epsilon),$$

or $$x = h\left(\frac{\cot \epsilon + \cot \delta}{\cot \epsilon - \cot \alpha}\right).$$

It should be noticed that if the sun were on the cliff side of the balloon the shadow would be in the position S'. We should then have

$$NS' - S'M = PL,$$

and the result would be

$$h\left(\frac{\cot \epsilon + \cot \delta}{\cot \epsilon + \cot \alpha}\right).$$

François.—Find the equation of a system of circles each of which passes through two given points symmetrically situated with respect to the axis of x.

A circle passes through the ends of those diameters of the circles $x^2 + y^2 - 2ax = b^2$; $x^2 + y^2 - 2a'x = b^2$ which are perpendicular to the axis of x. Show that its radius r is given by the relation $r^2 = a^2 + a'^2 + b^2$.

A purely analytical proof is as follows:—

Let the equation of any one of the circles be

$$x^2 + y^2 + 2gx + 2fy + c = 0. \quad . \quad . \quad . \quad . \quad (1)$$

The co-ordinates of the two given points will be of the form (x_1, y_1) and $(x_1, -y_1)$, and since they lie on the circle (1) we have

$$x_1^2 + y_1^2 + 2gx_1 + 2fy_1 + c = 0. \quad . \quad . \quad . \quad . \quad (2)$$

$$x_1^2 + y_1^2 + 2gx_1 - 2fy_1 + c = 0. \quad . \quad . \quad . \quad . \quad (3)$$

Subtracting corresponding sides of this equation,

$$4fy_1 = 0, \text{ or } f = 0,$$

since y_1 is not zero.

Hence, from (2), $c = -(x_1^2 + y_1^2 + 2gx_1)$.

Substituting these values of f and c in (1), it follows that the equation

$$x^2 + y^2 + 2gx - x_1^2 - y_1^2 - 2gx_1 = 0,$$

or $$x^2 + y^2 - (x_1^2 + y_1^2) + 2g(x - x_1) = 0,$$

represents for different values of g all the circles which pass through the given points.

If we make use of an elementary geometrical property this equation can be obtained more shortly. Since the axis of x bisects the straight line joining the points (x_1, y_1) $(x_1, -y_1)$ at right angles, the centre of any circle through the points must lie on the axis of x. Let this centre be the point $(k, 0)$. Then if (x, y) be any point on the corresponding circle, expressing that its distance from the centre is equal to the distance of (x_1, y_1) from the centre,

$$(x - k)^2 + y^2 = (x_1 - k)^2 + y_1^2,$$

or $$x^2 + y^2 - (x_1^2 + y_1^2) - 2k(x - x_1) = 0,$$

which equation for different values of k (that is, for different positions of the centre on the axis of x) represents all the required circles. This system of circles is evidently a coaxial system, with the straight line $x - x_1 = 0$ for radical axis.

The equations of the circles

$$x^2 + y^2 - 2ax = b^2; \; x^2 + y^2 - 2a'x = b^2$$

can be written

$$(x - a)^2 + y^2 = a^2 + b^2; \; (x - a')^2 + y^2 = a'^2 + b^2,$$

hence their centres are the points $(a, 0)$, $(a', 0)$ and their radii $\sqrt{a^2 + b^2}$, $\sqrt{a'^2 + b^2}$.

The extremities of the diameters perpendicular to the axis of x are the points P $(a, \sqrt{a^2 + b^2})$, Q $(a', \sqrt{a'^2 + b^2})$, and the two points which are *symmetrically placed to these with respect to the axis of x*. Hence, as in the first part of this question, the centre of the circle which passes through these four points lies on the axis of x. Let this centre be the point A $(h, 0)$. Since the radius of this circle is r, we have

$$r^2 = (h - a)^2 + a^2 + b^2, \quad . \quad . \quad . \quad . \quad (1) \text{ (PA is a radius)}$$

and $$r^2 = (h - a')^2 + a'^2 + b^2, \quad . \quad . \quad . \quad (2) \text{ (QA is a radius)}$$

therefore $$h^2 - 2ah + 2a^2 + b^2 = h^2 - 2a'h + 2a'^2 + b^2;$$

that is, $$h(a - a') = a^2 - a'^2;$$

that is, $$h = a - a'.$$

Substituting this value in (1) or (2),

$$r^2 = a^2 + a'^2 + b^2.$$

SPECIAL NOTICE.

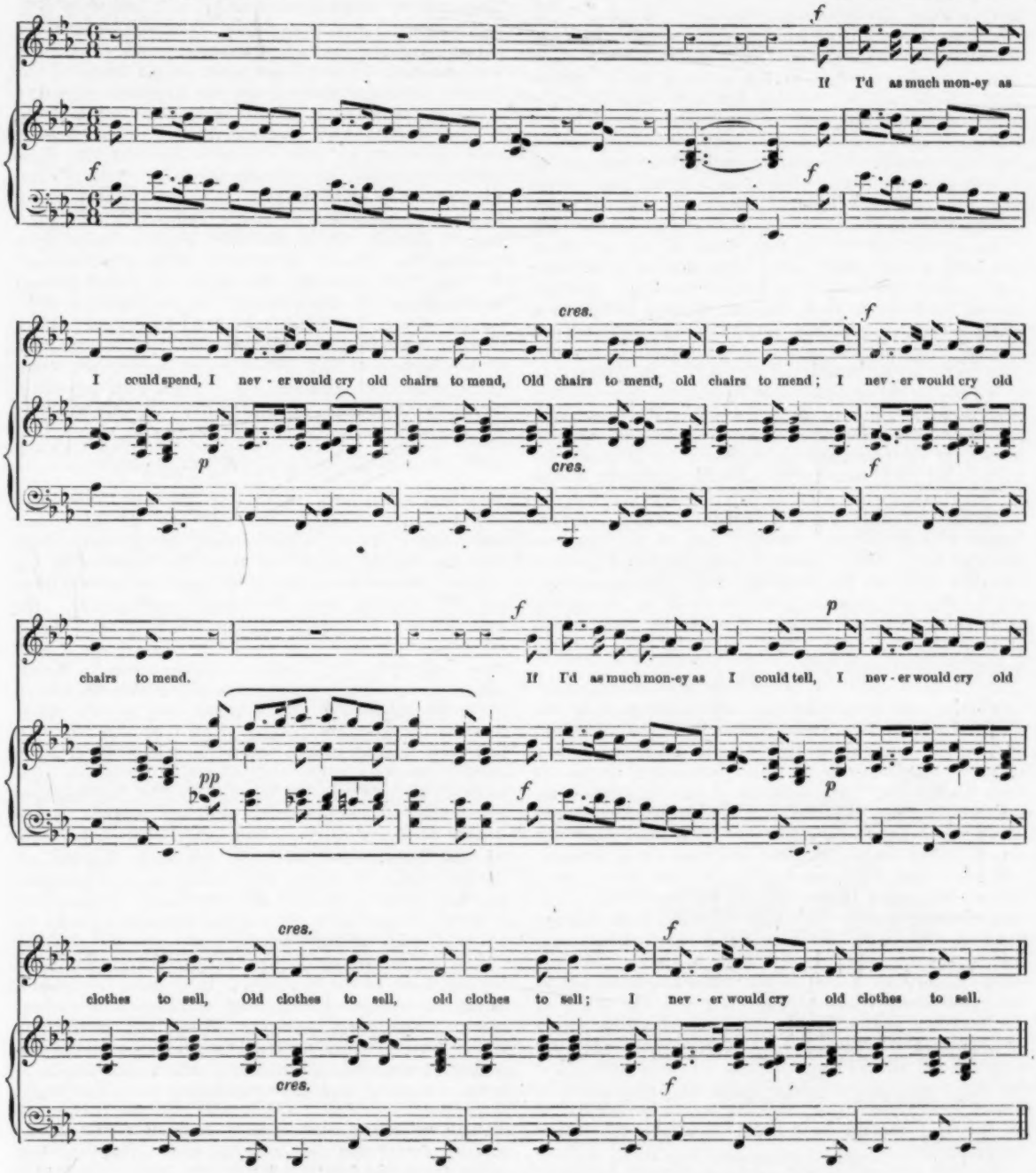
The Editor begs to announce, in connection with mathematical queries, that Mr. Clement Jones offers to future querists, not only solutions of questions submitted, but also further work of a similar character for the purpose of enabling the student to test his grasp of the best methods of elucidation.

Papers for Teachers of Infants.

---

*Words from "Songs of the Nursery."**

"IF!"

Music by THOS. J. HEWITT.

If I'd as much mon-ey as
I could spend, I nev - er would cry old chairs to mend, Old chairs to mend, old chairs to mend; I nev - er would cry old
chairs to mend.
If I'd as much mon-ey as I could tell, I nev - er would cry old
clothes to sell, Old clothes to sell, old clothes to sell; I nev - er would cry old clothes to sell.

* Published by T. Nelson and Sons in a series of school poetry books entitled *A Cycle of Song.*

LETTERS AS A PREPARATION FOR READING.

BY CLARA E. GRANT.

(*Continued from page 544.*)

The Personality of Letter A.

NOW it is a cruel fact that letter A and Co. have not only been deprived of their name, but have had hurled against them the serious allegation that they have a most uninteresting personality. Is it so? Is not letter A the hill up which toiled Jack and Gill, and the stick which they should have taken to save them from tumbling down? Is not letter E the pavement from which ran the two big brothers, and the baby who could only go half as far? Does not letter I represent the person of the greatest importance in the whole world, with an additional gift for personating a lamp-post, mother's clothes-post, a greasy pole—what you will? Is not letter O mother's ring, a hoop, "Ring-a-ring-a-roses"? Is not letter U the big swing in the park? Is not letter M also a swing, but with a very small seat? Has not letter m three legs? And you say he is not interesting! Do not letters D, d, P, p, B, b, R, and q bring before us a glorious feast of puddings small and big, some on one side of the dish and some on the other, whilst one goes so far as to tumble off the dish in its anxiety to be eaten? Can we really take no interest in a creature who literally pines to be eaten up? Verily enemies are cruel and indictments are grave, and all we can wonder is that we have not had a great law case for wilful libel and slander, the British Alphabet *v.* the British Pedagogue, with Dr. Blake Odgers for the defence. It would be a case of absorbing interest, before which "Druce" would "'gin to pale his ineffectual fire." Then, again, do not the letters provide excellent exercises for drawing, stick-laying, sandwork, etc.? May not a letter game be made as interesting as a nature game? After all, it is the form which at this stage has to be impressed if the child is to be helped to visualise at all.

As we have shown, it is quite as easy to evolve an interesting and profitable chat out of letter A as out of the form of the apple with which hoary custom has for so long associated it. As Professor Laurie says: "The learning of the elementary shapes in their unmeaning (?) nakedness is not a process insufferably tedious to a child. They interest him deeply as form lessons." Similarly we shall find that the capital letters are the simplest and most easily grasped, and when they are learned they give the clue to quite half of the small letters which are identical in form. As Dr. Gunn says: "We shall find the form relation the best clue to follow in studying the letters.....and it is by the eye that they are to be learned." But the skies will not fall if one teacher takes the small letters first and another the capitals, nor will the swing of the universe cease if some children discover words by a process of sounding out "k a t" and others by simply using the names; though we must agree that the latter method is equally simple for regular words, almost indispensable for irregular words, and is, after all, the final method for spelling, dictation, and future use generally.

The fact is that, in our laudable anxiety to study every new theory that comes up, to systematise our methods on the newest and most popular lines, we are apt to discard all that is old just because it is old, forgetting that there may be factors in the old which have given it its tenacious hold on life, and which may be equally useful still, and we have been apt to see difficulties and troubles where none exist. No one wishes to see the old alphabetic method resuscitated, with its wearisome "spellings" and mechanical dependence on mere names of letters, with no regard for function and logical word-construction. But the fact remains that words are composed of letters; that letters, until studied, are strange, and therefore difficult to group; and that, finally, the alphabet with the names has to be, sooner or later, acquired. Some fun was caused a few years ago when an old friend of the English language pointed out the apparent absurdity of the statement that "c a t" was "cat." How could it be? Must it not be "see-ay-tee"? Yet, surely, ever and always, "c a t" does represent the three symbols required for writing the word "cat;" and when we ask a child to spell "cat," we are only asking him and helping him, in an abbreviated form of question, to do this. If, on the other hand, we insist upon his sounding "k a t," we are only helping him to spell it "kat" for evermore. Of course, the visual method usually helps the child most; but the visual method cannot always be relied upon, and there are certain children who are undoubtedly aided by the repetition of the names of the letters which form that word. If so, why deny him the aid it gives him, especially when, in anomalous words, he has only his eye and the names of the letters to help him?

The Child and Letter A.

Letters would seem, then, to be the basis of reading; and does not genuine child study bear us out in our contention? It is probable that nearly every child who has taught himself to read has begun with his letters. Moreover, do what we may, *we cannot shut out the alphabet from the child's environment.* He sees to that, in spite of all our efforts to exclude it. Do not letters face him on every side—in shop windows, placards, toy books, picture books? Watch him, and see if he does not invariably tackle the letters first. An H.M.I. of our acquaintance, keenly interested in the question, told us of his own children, who had been trained in two successive schools on a most careful phonetic plan, and who yet invariably discovered their words by saying out the letter-names which they had so carefully been *not* taught! Some system of logical word-construction would seem to be necessary and economical for the large number of regular groups of words, and such a method provides excellent mental training and develops interest. But it is more than likely that, in our laudable anxiety to be intelligent and systematic, we may be pressing unduly on our young children severely logical methods beyond their power to follow. It is most important, of course, to teach intelligently, otherwise the reading lessons stand apart from the educational curriculum of the school; but it is equally important to avoid the danger of crowding more mental effort into the processes of reading than there would be in the result itself. Nay, more, the fact remains that, in the matter of reading, when the word is once acquired, by whatever method (and that, probably, is best known to the child), the method is "shed" as completely as if it had never been learned, and the child's interest becomes,

and rightly, centred on the subject-matter rather than on the construction of the word and its component sound-values.

The people who so glibly say, "Oh, it's as easy as A B C," little realise what a vast mass of complex and elaborate detail has gathered round the teaching of that A B C. Much has been done to vivify methods of teaching reading, to make of its processes a valuable educational weapon, and this has been all to the good both of the child and of the teacher. But it is possible that some of us have gone too far in this direction, and needlessly involved children in the mechanism of words and in highly involved methods of approach, where a simpler, more direct, and elemental method might ensure quicker progress and greater variety of reading matter, which is, after all, the chief aim so long as we do not begin too early. If therefore a knowledge of letters will facilitate reading, as we believe it will, then let us not be afraid of them. Some of those who feel obliged to fall in with modern iconoclasts and to throw over the letters have, if we mistake not, a sneaking regard for the dear old things, though they dare not say so. Well, it may be that our old friends will once again come into their own. There are times when it may be well to "stand in the old paths," only taking care to remove all the stones.

THE STORY OF THE RIVER.

BY E. MONA CLAY AND R. M. M. ATKINSON, INSPECTORS OF SCHOOLS, MANCHESTER EDUCATION COMMITTEE.

LAST month the special note sounded in our scheme related to the awakening of animal life after the winter's sleep. The lesson for this month, on "riverside vegetation," calls attention to the fact that plant life in nature is ready to blossom out again also.

I.—SKETCH OF A LESSON ON RIVERSIDE VEGETATION.

Preparation.

Refer to the flowers found in and about a river. Let the children name and describe as many varieties as they can, and then lead up to the coarser forms of vegetation found about the waterside.

Presentation.

I. The Rush.—Hand round a few specimens, and let the children note that the rush is from two to three feet in length, and green and smooth in appearance. It is cylindrical in form, and filled with a lining of soft, white pith. The tiny flowers, which are found not at the end of the rush, but in a cluster about halfway up, are brown in colour, and make their appearance in July.

II. The Reed.—Point out that this plant, which looks rather like a very large variety of grass, grows in masses by the side of marshes and rivers. Describe the feathery-looking collection of flowers, which are purplish-brown in colour, and, like the rush, are in flower in July. Refer to the nests made of its leaves and stem by the reed-warbler, and show how a reed-bed provides a home for various creatures which are to be found about the waterside.

III. The Reed Mace, commonly called the Bulrush.—This plant is really not a bulrush, although it generally gets that name. It will be easily recognised by the children by its size, its long, grass-like leaves, and by the large, characteristic spike, which towards the end of the season looks and feels like brown velvet.

IV. The Duckweed.—Place a few of these little green plants in a glass vessel, and observe that they float on the surface of the water, and have one or more thread-like roots which hang down into the water. The nourishment required by the plant is obtained partly from the air and partly from the water. Let the children tell why these plants are not found where the water flows swiftly, but only where there is little movement.

V. The Water Hemlock.—This is a poisonous plant which grows along the side of streams and rivers. The stem is hollow and grooved, the root resembles a parsnip, while the finely toothed leaves have often been mistaken for those of celery.

VI. Pond Weeds.—Mention the pond weeds which may be seen floating on the surface of almost all ponds and streams. Allude to the leathery leaves, and tell that these and the stems of the plant afford food and shelter to many creatures which are to be found about the waterside.

Association.

Associate the types of plant life dealt with in the lesson with those discussed in the lesson on riverside flowers.

Formulation.

Besides the gaily coloured flowers growing about the riverside, there are many other types of vegetation, quite as varied and interesting, if we will take the trouble to find and study them.

Application.

See occupations.

EXPLANATION OF ILLUSTRATIONS.

Teacher's Illustration.—This scene should be drawn on the blackboard before the lesson. It is good in many cases to prepare

TEACHER'S ILLUSTRATION.

the illustration previously: it excites interest, especially if some kind of introduction is essential to the good understanding of the subject.

Painting.—Use brown paper, and green and white, or very pale yellow, paint. Paint the stems green first, then the leaves.

PAINTING.

Only very careful touches will be required to represent the flowers. Indeed, the whole result depends on delicacy of execution.

Modelling.—This object requires a slab. Make one by the directions given in previous lessons. Use about a quarter of a pound of clay for each child. It will be better not to divide it up, but use as required from the lump. This prevents it from becoming too dry. Proceed with this model as shown in the picture. The bulrushes will be cylindrical, the leaves flattened out somewhat. See that the points at the top of the bulrushes are carefully made and the leaves pointed at the tip.

MODELLING

II.—SKETCH OF A LESSON ON COMMON BIRDS.

Preparation.

Discuss briefly the lesson on the nests of birds, and refer to the opportunities which the children may take of trying to recognise the commoner birds when visiting the country and also the parks in the towns.

Presentation.

I. The Skylark.—Recall the nest made on the ground, and gain from the children, supplementing where their knowledge fails, how to distinguish the lark. Note that it is reddish-brown, streaked with black on the back, and has a speckled breast. It is easily known by the tuft of feathers on its head. Refer to its song and the way it soars skywards, taking a spiral course, and then allude to the way it drops when near the ground.

II. The Thrush.—This bird is seen almost everywhere—about the roadside, in the woods, and also near human dwellings. It is a large, brown bird, very shapely in form, with light-coloured breast speckled with dark spots. Recall its nest and the blue spotted eggs.

III. The Blackbird.—This bird resembles the thrush, but is glossy black in appearance. Distinguish between it and the starling by the fact that the former hops while the latter walks.

IV. The Yellow Bunting or the Yellow-hammer.—The children, when in the country, will be easily able to recognise this bird by its peculiar, repeated strain of several notes of the same tone, and a concluding one a tone higher or else lower. Tell that the country people say the bird sings, "A little bit of bread and no *cheese*" (accent on the last word). Describe the plumage, which is yellow and brownish-red, and tell about the eggs, marked with streaks like writing.

V. The Cuckoo.—This grayish-white bird arrives in our country in April, and leaves in July for a warmer land. The children will know it by its cry of "cuckoo! cuckoo!"

VI. The Wren.—Point out that this bird, generally associated in the children's minds with the robin redbreast, can be recognised by its tiny size and by its peculiar, erect tail.

VII. The Rook.—The children will be able to tell the rook by its large size, its black plumage, its powerful beak, its somewhat harsh "caw, caw," and by the fact that it is a social bird, living in a community. Refer to the nest, its construction and position, and tell of the curious habits and customs of these birds.

Association.

Associate the different birds, their appearance, characteristics, etc., with any others known to the children.

Formulation.

The beautiful appearance of birds, their gift of song, and the great work they do for us, should lead us to study them, and, when necessary, lend them our protection.

Application.

See occupations.

EXPLANATION OF ILLUSTRATIONS.

Teacher's Illustration.—The bird shown here is the thrush.

TEACHER'S ILLUSTRATION.

Painting.—The outline of this is not difficult to get. A dark, purplish colour will be required for the bird, and a touch of yellow will be wanted for painting the beak and legs. For the rest, indicate the position of the branch upon which the bird stands with some fine lines.

PAINTING.

MODELLING.

III.—SKETCH OF A LESSON ON THE SWALLOW.

Required for Lesson.

Sketches of the swallow and such birds as the sparrow and robin; also a model in clay of the swallow's nest.

Preparation.

Lead up to the lesson by questioning as to the birds seen in the winter-time, the migration of some of these northwards on the approach of spring, and the return of others from warmer countries.

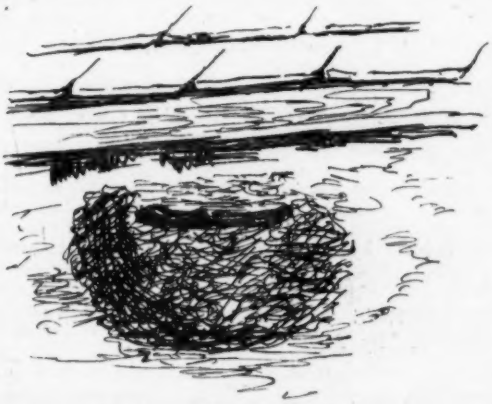
Presentation.

I. Description.—(*a*) Show pictures, and let the children find out that the swallow is blue-black in colour on the upper surface, and white on the under. (*b*) The body is small and slender compared with such birds as the thrush. Point out the advantage of this to a bird nearly always on the wing. (*c*) Note the very large wings and the long, forked tail. Contrast with such birds as the sparrow and the robin. (*d*) Let the children observe the legs and claws of the swallow and sparrow. Explain that the feet of the former are weak and not well suited for walking purposes. (*e*) The beak is broad and short. Draw attention to the wide gape when the bird opens its mouth.

TEACHER'S ILLUSTRATION.

II. Characteristics.—(*a*) Let the children describe the way the swallow flies. It skims along very rapidly, moving in curves. Contrast with the flight of the sparrow. (*b*) The swallow's food consists of insects, which it catches when on the wing. Refer to the advantage of the wide gape of the mouth, and tell of the sticky fluid within the beak. Allude to the sticky tongue of the frog. (*c*) Point out that the swallow is generally to be seen near water, and gain the reason for this. Note that the swallow drinks also when flying. (*d*) Tell the class that this bird is rarely to be seen on the ground, and recall to their minds its short legs and awkward feet.

III. The Swallow's Nest.—Refer to the lesson on "Nests," and let the class describe the shape, construction, and position of the swallow's nest.



PAINTING.

IV. Migration.—(*a*) Tell of the flight of the swallows in the autumn to warmer countries, and the training of the young birds to prepare them for the long journey. (*b*) Lead the class to see that the reasons for this annual migration are the inability to find insect food, and also the cold weather. (*c*) Gain from the children, if possible, that the swallows begin to return about the middle of April.

Association.

Associate with the robin or the sparrow.

Formulation.

A brief account of the swallow in the children's own words.

Application.

See occupations.

EXPLANATION OF ILLUSTRATIONS.

Painting.—Paint the piece of roof brown and the nest a dull ochre colour, similar to the colour of the wall against which the nest is placed.

MODELLING.

Modelling.—The nest must be rather flattened on one side and made to adhere to the modelling board, which can be held up to show the position occupied by the nest when against the side of the house.

IV.—SKETCH OF A LESSON ON BEES.

Required for Lesson.

Honeycomb, a little honey, and some beeswax.

Preparation.

Refer to the lesson on the primrose, and recall the brief allusions made to the work of the bees in gathering honey, and in helping the flowers by carrying pollen from one to another.

Presentation.

I. The Bees' Home.—(*a*) Gain, by questioning, that bees do not live singly, but in a community. Let the children describe that the nest or hive is either domed in shape and made of

TEACHER'S ILLUSTRATION.

straw, or is a specially constructed wooden box, with a tiny opening for the bees to pass in and out. (*b*) Refer to the three

varieties of bees found in every hive—(1) the queen, that lays all the eggs; (2) the drones, that do no work, and are killed or expelled when the cold weather comes; (3) the workers, that gather honey and pollen and attend to the hive.

II. The Bees' Work Abroad.—Show an enlarged drawing, and let the children tell the three parts into which the bee's body is divided, and then describe the wings, the large eyes, the hairy legs and clawed feet, and the peculiar, trunklike mouth. Tell of the way the bee visits the flowers, gathers the sweet juices, and takes away a quantity of pollen. Point out how the latter is rolled into a ball, placed in the "basket" of the bee's hind legs, and conveyed to the hive to be converted into food.

III. The Bees' Work at Home.—(*a*) Explain how the bees hang in clusters from the roof of the hive and secrete the wax with which the cells are made. (*b*) Show honeycomb, and allow some of the children to draw the hexagonal shape. Tell how the comb is gradually built up, filled with honey, and then sealed. (*c*) Some of the workers act as nurses, look after the cells in which the eggs and grubs are, and also feed the latter on food made from pollen and honey. (*d*) A certain number of the bees are deputed to wait on and guard the queen. (*e*) Tell how some of the wax-workers take it in turns to keep the hive cool by standing in rows at the entrance and creating currents of air by the movements of their wings. Question as to our means of ventilation.

IV. The Bee's Sting.—Show where the sting is situated. Tell how it is used, and refer to the poison which is poured into the wound made by the dart of the sting.

V. Uses of Bees.—These should be found out and given by the children.

Association.

Associate with such insects as are well known to the children—the fly, the wasp, etc. The daily routine of work and the social life in the hive may be compared in a simple manner with life in such a community as that in which the children live.

Formulation.

Bees supply us with honey and wax. They help plant life by distributing pollen, and are an example to us of what may be achieved when all work together for the common good.

Application.

See occupations.

EXPLANATION OF ILLUSTRATIONS.

Teacher's Illustration.—This illustration could be partly drawn before the lesson begins, and the details filled in as the teaching proceeds.

PAINTING.

Painting.—Use brown paint—vandyke is good. With the point of the brush get the outline of the insect, with legs and wings. The legs should show the joints. This is easily done if the painting is on white paper. The outline for the wings must be done in very fine lines, and some quite minute touches added inside. Do not, on any account, colour the wings entirely over.

MODELLING.

Modelling.—There are two ways of representing a straw hive in clay. You may obtain the shape by hollowing out a ball of clay with the hands, and then with an instrument make marks upon it to obtain the effect of the straw. It is often done by this method. But the manner shown in the illustration is preferable, because it has more work in it, and it is more realistic when finished. It is done as follows. Roll pieces of clay to a cylindrical shape, and, beginning at the base, build up the form of the hive by turning the rolled pieces round and round till the top is reached. The circle must gradually get smaller to obtain the rather conical shape at the top. A small hole must be made in front at the base, and the hive may rest upon a slab to represent a table without legs.

SPECIAL NOTICE.

NEXT MONTH.

TEACHERS who wish to give lessons on Champlain in connection with the Canadian Tercentenary will be interested to learn that Miss E. M. Wilmot-Buxton has written two historical articles on the subject, and that these will appear in the *Practical Teacher* for June and July respectively.

IMPORTANT ANNOUNCEMENT.

Messrs. THOMAS NELSON AND SONS beg to announce the early publication of a series of

HANDBOOKS OF MORAL INSTRUCTION,

prepared in accordance with the Syllabus of the Moral Instruction League.

The following is the complete list:—

For Young Children and Teachers of Infants.

THE GARDEN OF CHILDHOOD. By Miss ALICE CHESTERTON.

For Junior Pupils (Standards I. and II.) and their Teachers.

A Volume by Miss CHESTERTON.

For Junior Pupils (Standard III.) and their Teachers.

THE MAGIC GARDEN. By Miss CHESTERTON.

The above volumes will be fully and beautifully illustrated.

For Standard IV.

A Volume by W. ROBSON and W. H. BALDWIN.

For Standard V.

A TEACHER'S HANDBOOK OF MORAL LESSONS. By A. J. WALDEGRAVE.

For Standard VI.

A Volume by J. H. WICKSTEED.

For Standard VII. and the Lower Forms of Secondary Schools.

A Volume by A. J. WALDEGRAVE.

(*This volume will contain a special course on Citizenship.*)

Price 1s. 6d. net each.

THOMAS NELSON AND SONS,
London, Edinburgh, Dublin, and New York.

Our Prize Competitions.

RULES.

1. All French translations **must be received not later than May 8, 1908**, and addressed to:—PRIZE EDITOR, Office of *The Practical Teacher*, 35 and 36 Paternoster Row, London, E.C.
2. Competitors should cut out and send the *coupon* which appears on the Back Wrapper page of the current number. One coupon must be sent for each entry.
3. Competitors in No. I. should write pseudonym only on MS. Prize-winner will be asked to send name and address for publication.
4. No competitor may take the prize offered more than once in three months.

I.—FRENCH TRANSLATION COMPETITION.

A Prize of **Half a Guinea** is offered for the best rendering into English of the following extract:—

Voulez-vous faire d'honnêtes gens de vos enfants?

Ne soyez que leur père et non pas leur juge et leur tyran. Et qu'est ce que c'est qu'être leur père? C'est les persuader que vous les aimez. Cette persuasion-là commence par vous gagner leur cœur. Nous aimons toujours ceux dont nous sommes sûrs d'être aimés; et quand vos enfants vous aimeront, quand ils regarderont l'autorité que vous conserverez sur eux, non comme un droit odieux que les lois vous donnent, et dont vous êtes superbement jaloux, mais comme l'effet d'une tendresse inquiète, qui veut leur bien, qui semble les prier de ce qu'elle ordonne de faire, qui veut plus obtenir que vaincre, qui souffre de les forcer, bien loin d'y prendre un plaisir matin, comme il arrive souvent; oh! pour lors vous serez le père de vos enfants; ils vous craindront, non comme un maître dur, mais comme un ami respectable, et par son amour, et par l'intérêt qu'il prend à eux; ce ne sera plus votre autorité qu'ils auront peur de choquer, ce sera votre cœur qu'ils ne voudront pas affliger; et vous verrez alors avec quelle facilité la raison passera dans leur âme, à la faveur de ce sentiment tendre que vous leur aurez inspiré pour vous. Je vis deux petits enfants de sept à huit ans chacun qui me parurent de très jolies machines; je les appelle machines, parce qu'on les avait seulement dressés à prononcer quelques paroles: Comme *je suis votre serviteur. Vous me faites bien de l'honneur*, etc., ce qui ne me plut guère. Eh! mon Dieu, dussent les enfants ne répondre que des impertinences, laissons-leur avoir des pensées en propre; à quoi leur servent ce qu'ils répètent en perroquets? Ecoutons leurs impertinences, et disons-leur après: ce n'est pas cela qu'il faut dire. Rien ne rend leur esprit plus paresseux que cette provision de petites phrases qu'on leur donne, à laquelle ils s'attendent.

From "Le Spectateur français. Seizième feuille,"
by PIERRE DE MARIVAUX.

RESULT OF THE APRIL COMPETITION.

The prize is awarded to "Alder." (Will "Alder" kindly forward name and address for publication?)

First Class.—Baloo, Selaginella, Shakspere, Kinlochlaich, Lemuel Gulliver, Black, Rennes, Worthless, Pepys, Merry England, Essor, Lev, Clubs, Rouge-Gorge, Minna Troil, Passif, Elsass, Vol, Kettering, Gawayn, Sans souci, Angèle, Jonenri, Ebb and flow, Havre-des-pas, Emerald, Atlas, Snowflake, Pearl (A), Sur mer, St. Cuthbert, Bric-à-brac, Pearl (B), North, François, A. E. F., Rano, Rita, St. Ternan, Volo, E. S., L., Ignota, Lias, Wer, Brondesbury, Æneas, Dubitas, Wren, Lethe, Ben, Aca, Craigellachie, Mavis, Boni, Adelaide, Tuan Kaya, Surprise, Syd, Tyro (primus), Violette, Maid Margaret, Granite City, Scotia, Oliver Twist, Monaghan, Florentia, Josephine, Kay, St. Oswald, Imogen, Sonia, Espérance, Sunderland, Weltgeschichte, Horseley Heath, W. J. S., Girvan, Scixio, Jostedalsbrae, Bab, Ap Iago, Yvonne, Nothsa, Marie Rose Julie, Talbot, Milch, Spinoza, St. Hilary, Promiscuous, Admirateur, John Halifax, Yann, Camélias, Inverness, Vie.

Second Class. — Bishop, Ariel, Mifanwy, Celt, May, Gladiator, Richelieu, La jeune fille, N. D. C., Water-rat, Chaco, Edna P., Minna, Alix, Mal, Teacher, Warwick.

Received too late for classification.—Walpurgis, Max, St. Dié.

The name and address of "Rae," the winner of last month's competition, are:—Miss E. A. Ready, 27 Lower Hastings Street, Leicester.

REPORT.

The quality of the translations is more than maintained. The only errors of any importance in translation were the mistaking of *ça* for *çà*, and translating *jour* in its ordinary sense; but there were many cases of English words being used which were beneath the dignity of the theme. Were the space at our command greater, we could give a lengthy list of them. As a specimen, the reference to the sea "fidgeting" (*se remuait*) will explain what we mean. One candidate suggests a German prize translation. We tried this for some time, with good success at first, but it had to be dropped, as the numbers fell off. Another candidate complains of not getting his paper till the 2nd of the month. This complaint should be addressed to the Manager. In answer to a query, we beg again to say that we endeavour to arrange candidates in order of merit.

PRIZE TRANSLATION.

Then suddenly I stopped, as though rooted to the spot, and shuddering with fear. Something appeared in front of me, something dark and roaring, which had come into sight on all sides at once, and which seemed to have no end—a moving expanse which made my brain reel. Evidently *that was it.* Not the slightest hesitation, not even a momentary surprise, *that it was like that.* No, my only feeling was one of terror. I *recognised*, and trembled. It was of a dark green colour, almost black; it seemed unstable, treacherous, devouring; it was surging and seething in every part at once, presenting an aspect of ominous malignity. Over it stretched the sky, an unbroken covering of dark gray, like a heavy mantle. It was only in the far distance, almost farther than sight could pierce, that one could just discern a rift, a bright space between the sky and the water, a long gaping rent, of a pale and ghastly yellow. But how did I thus come to recognise the sea? Was it that I had seen it before? Perhaps my gaze had rested on it unconsciously when, at the age of about five or six months, I had been taken to the island of Oléron, on a visit to a great-aunt, my grandmother's sister. Or was it that it had been so constantly before the eyes of my seafaring ancestors, that a confused image of its immensity had already been formed in my brain before my birth? We remained for a short time in each other's presence, the sea holding me spellbound. Doubtless from that first meeting dated my indefinable presentiment that the sea would one day claim me, in spite of all my hesitation, in spite of every determination to prevent it. It was not merely dread that I felt in its presence, but rather a nameless sadness, a sense of miserable solitude, of loneliness, of exile. "ALDER."

II.—COMPOSITION COMPETITION.

A Prize of *Seven Shillings and Sixpence* is offered for the best pupil's rendering of the *Story of Jason and the Golden Fleece.* The tale must be given entirely in the pupil's own words, and this ought to be guaranteed by the teacher sending in the paper or papers. *Two entries* may be made for each coupon from the cover of *The Practical Teacher.*

The story is told in Kingsley's *Heroes*, in Hawthorne's *Tanglewood Tales*, and in numerous recent collections of classical tales, but it need not be recounted at greater length than about five or six hundred words. Competitors must not be more than fifteen years of age. Will teachers please give *on the paper sent in* the name, age, and school of competitor, with names also of class teacher and head master or mistress if desired? Please do not use pins to fasten papers together. The last day for reception of papers is June 1.

NOTES FROM THE NORTH.

BY ROBERT DICKSON, M.A., F.E.I.S.

The Institute Elections.

THE election for the Presidency and Vice-Presidency of the Institute takes place during the month of May. Two candidates for each office have entered the lists, and the great increase in the membership of the Institute during the past year will cause considerable doubt as to the issue. For the first time in the history of the Institute the "blue ribbon" of the profession is to be sought by a class teacher. This lends some interest to the contest, inasmuch as a great deal of the increased membership is due to the large accession of the younger members of the profession. In former years the place of the next year's Congress was a determining factor. It is now felt, however, by a large number of the members that this should have no influence on the election, but that the best man, irrespective of local considerations of the Congress meeting-place, should be chosen. For the Vice-Presidentship both the competitors are rural teachers, it being felt that in the very near future their conditions of service and prospects will require to be tackled by the Institute with a firm hand. It is but fitting therefore that the Institute should have in one of its chief offices a representative of the rurals. I anticipate a large poll, and may the best man win.

* * *

Mr. George Fenton, B.A.

IT may not be out of place to give a short sketch of the careers of the aspirants to the highest honour the teaching profession of Scotland can give. Mr. George Fenton, B.A. (Lond.), is a native of Aberdeen. Educated and trained in the Granite City, he entered the Free Church Training College, Edinburgh. There he took a very prominent place in the examinations, and was looked upon as one likely to make his mark. On leaving that institution Mr. Fenton entered on his life-work as a teacher in Gordon's College, Aberdeen, then, as now, one of the best secondary schools in that city. After a short time there he resolved to enter the Aberdeen School Board's service. His excellent work as a teacher was soon rewarded by promotion to be first assistant or second master in Holburn Street School. From there he was transferred as second master to Kittybrewster School, where he is at present engaged. Since he became a teacher Mr. Fenton has been closely identified with both Institute and Class Teachers' Association work. His spurs as a leader he certainly won in the ranks of the class teachers. For some years he acted as secretary of the Scottish Class Teachers' Association, in which position I first became acquainted with him. The work he did in that office is perhaps only known to those who were closely associated with him. His energy, enthusiasm, and level-headedness soon marked him out for higher offices, and on resigning the secretaryship he was appointed President. It was at that time that the Scottish Class Teachers resolved on issuing a pamphlet or magazine, so as to fight more effectively the battle in which they were engaged. Naturally this work was entrusted to Mr. Fenton, who had by his speeches and writings shown that he had the necessary qualifications for the editorial chair. As his colleague in that office, I can say that he worked like a Trojan, and the success of the venture is to a very great extent due to his undoubted ability. When the question of superannuation was in the air, and when teachers were discussing the Act and the improvements they thought should be effected on the present scheme, Mr. Fenton, by a series of exhaustive and valuable articles on the subject, did much to educate public opinion and to supply facts and figures for those engaged in the fight. His work on behalf of superannuation, if nothing else, entitles him to the gratitude of his colleagues in all parts of the country. He was sent to Sheffield Conference of the N.F.A.T. to represent the Scottish teachers. In the Institute, too, he has done excellent work. He has acted on nearly all the committees, and, a born fighter, he has

MR. GEORGE FENTON, B.A.

done much to help in the forward policy of the Institute during the last decade. He was Vice-President for a year, and acted as delegate to the Llandudno Conference of the N.U.T. Doubtless with such a record of work on behalf of class teachers, Mr. Fenton will rely on them for the greater part of his support. But he has also, by voice and pen, sought to help forward the rural question. The very best traditions of the office I feel will be safe in his hands. His long experience, his business-like qualities of administration and leadership, his earnestness of purpose, his intimate knowledge of all sections of the profession, and his indomitable energy and enthusiasm, all combine to make Mr. Fenton an ideal candidate.

* * *

Dr. George Lowson.

DR. GEORGE LOWSON was a candidate for the office last year, and received 2,333 votes against 2,825 polled for Mr. J. M'Whan, the present holder of the chair. A native of the county of Forfar, Dr. Lowson was educated at the village school of Letham and Arbroath High School. In 1876 he entered St. Andrews University as first bursar, and during the whole of his university career he took very high places and gained valuable special prizes, medals, and bursaries. He graduated in 1881 as Bachelor of Science, and in 1882 as Master of Arts, with first-class honours in the department of mathematics and natural philosophy. From 1880 to 1882 Mr. Lowson acted as assistant professor of mathematics, and while so en-

gaged he rendered great assistance to Professor Meiklejohn in the preparation of his *Life of Professor Hodgson*, and of the many excellent text-books associated with Professor Meiklejohn's name.

DR. GEORGE LOWSON.

In 1882 Mr. Lowson took up the position of mathematical master in Stirling High School, to the rectorship of which institution he was appointed in 1902. From 1892 to 1894 he acted as Preliminary Examiner in Mathematics and Dynamics for the University of St. Andrews, and was one of the representatives of that body on the Joint University Council. In 1903 he received the honorary degree of LL.D. from his *alma mater*.

Dr. Lowson has been a member of the Institute for over twenty years, and during that period he has taken the greatest interest in its work. He has been President of the Stirling Branch and Vice-President of the Institute, while he has served on all the important committees for many years. Like Mr. Fenton, he did much to elucidate the provisions of the Superannuation Act. Dr. Lowson is a ripe scholar, a fluent speaker, and an able debater. In every department of education he is an indefatigable worker, while his shrewd judgment has always commended him as a wise counsellor. If Dr. Lowson is elected President, it goes without saying that he will serve the Institute with dignity and success. As a keen business man he will be able to conduct the deliberations of the various committees with keenness and judgment. His past work on behalf of the Institute warrants the hope that he will give the same diligent attention to the widely increasing administrative work that the Institute is now called upon to undertake.

FOR the Vice-Presidentship two candidates are announced. Mr. Edward M'Currach is the headmaster of Newabbey School, Dumfries. For eighteen years he has been secretary of the Dum-

Mr. Edward M'Currach.

fries Branch, during which time the membership has increased from 80 to 249. This increase is in great measure due to the work of Mr. M'Currach, who is most popular with all sections of the teachers in the district. He was the first vice-president of the branch, and latterly occupied the position of President. But, perhaps, the fact that he acted as Congress secretary on two separate occasions—namely, 1902 and 1908—brought him into greater prominence. Those of us who have served as secretaries on such occasions have some idea of the amount of work entailed upon him. For five years he was a member of the General Committee of Management, and though he did not take an active part in the debates, yet every one knows the deep interest he took in the subjects discussed. He also acted for a year on the Special Committee, the Executive of the Institute. His genial disposition, tactful manner, and business-like qualities fully entitle him to very favourable consideration from the members of the Institute, and especially at this juncture, when the claims of rural teachers are being so prominently discussed.

FOR the last thirteen years Mr. John Purdie, B.A., has been headmaster of Birnam School, Dunkeld. After having a distinguished career at the Glasgow Church of Scotland Training College, Mr. Purdie found time to take the B.A. degree of London University. He has had experience as an assistant in primary and secondary schools. In connection with his work in the Institute he has done much to earn the respect and gratitude of his colleagues. For many years he has been a most able and active member of the Perthshire Local Association, and a few years ago was elected President. During the last four years Mr. Purdie has represented his branch on the Council of the Institute, and has also done valuable work as Convener of the Rural Teachers' Committee. It may safely be said that it is in connection with this latter office he has won his spurs. His experience, ability,

Mr. John Purdie, B.A.

MR. JOHN PURDIE, B.A.

and knowledge of affairs are sure to recommend him to a large number of his fellow-teachers. In connection with the office of Vice-President, it may be pointed out that election to this office does not carry with it promotion to the higher post of President after a year's service.

DICTÉES FRANÇAISES.

THE CHIEF DIFFICULTIES AND ANOMALIES OF FRENCH PRONUNCIATION SYSTEMATISED AND ILLUSTRATED.

BY GEORGE H. KNIGHT, L.C.P.

AN experience of many years as a modern language master has brought under my notice the difficulties that sometimes present themselves as to the correct pronunciation of certain combinations of letters in French words. There is the normal pronunciation of the combination, and there is one that appears to be the anomalous one. The student frequently stumbles in consequence. To take a simple example:—The vowel "*e*" in certain cases is sounded like "*è*;" again, it is before "*m*" sometimes sounded as the French "*an*;" or, finally, it is sometimes sounded with "*n*" as "*in*." We have *bien*, *chrétien*, as familiar instances.

Again, "*ill*" is sometimes mouillé and sometimes not. Or the vowel combinations "*oi*" is always diphthongal; "*ié*" is sometimes diphthongal and sometimes dissyllabic; "*ua*" is sometimes dissyllabic and sometimes diphthongal. We say "*suavité*," and immediately after, "*aquarelle*." In the first case "*ua*" is dissyllabic, in the second case diphthongal. Now all these anomalies, as they appear at first blush, on examination can be found to be more or less reducible to a law—that is, there is a law governing the anomaly.

The object of these pages is to facilitate the pronunciation of French by pointing out what the law of pronunciation seems to be in the cases that are generally pitfalls, and illustrating the law by numerous examples. Now that *vivâ voce* and dictation in the foreign tongue are generally compulsory for examination purposes, the following pages may be found useful to private students or for class purposes. It may be a matter *in tenui labor* for the author; but if the use of these pages shall conduce to a more correct pronunciation of some of the words that prove pitfalls to the unwary student, so that he may speak that almost perfect vehicle for expressing thought without making "howlers" in pronunciation, then I shall not have worked in vain.

DIFFICULTIES AND ANOMALIES OF FRENCH PRONUNCIATION.

Vowels.

E is pronounced "*è*" before double consonants.

Ex.—*Effeuiller, belle, ombrelle, j'appelle, gemme, garenne, terre, cesser, essai, mettre.*

E, by exception, is pronounced "*a*."

1. In words ending in "*emment*."

Ex.—*Prudemment, ardemment, fréquemment, décemment, récemment, concurrémment.*

2. In the following words: *Indemnité, indemniser, femme, solennel, solennité, hennir, hennissement, nenni, rouennerie.* (Pronounce *in-da-mnité, sola-nel, na-ni.*)

E is mute before "*ss*" in the following words: *Dessus, dessous, ressembler, ressaisir, ressortir, ressource, resserer, ressort, ressouvenir, ressauter, ressemeler, ressouder.* (Pronounce *de-ssus*, and not *dè-ssus.*)

EM, EN is pronounced "*an*," as the French say it, in *emmener, emmancher, emboîter, empêcher, temps, septembre; ennui, ennobler, enivrer, enorgueiller, entendre, dépenses.* (Pronounce *an-mener.*)

EM, EN, by exception, are pronounced "*ème*," "*ène*" at the commencement of the following words, where the two *m*'s or *n*'s must be distinctly heard: *Emma, Emmaüs, Emmanuel; ennemi, ennéagone, Ennius.* (Pronounce *èm-ma, èn-nemi.*)

EM, by exception, is pronounced "*in*" in the following words, as the French say it: *Memphis, sempiternel, Guttemburg, Nuremburg, Rembrandt, Sempronius, Wurtemberg.* (Pronounce *sempiternel* as if written *simpiternel.*)

EN, by exception, is pronounced "*in*," as the French say it, in—

1. When it terminates words.

Ex.—*Bien, chrétien, le sien, le mien, chien, vendéen, européen*, and in their compounds—*chrétienté, bienfait, Vendéen* (pronounce *Vendé-in*); but there are words where "*en*" at the end is sounded as usual: *Rouen, Ecouen.*

2. In the forms of the verbs *venir, tenir*, and their compounds.

Ex.—*Il tient, tu viendras, nous conviendrons*, etc.

Applications and Phrases.

Le vent effeuille les arbres. Le lapin de garenne essaye de fuir vers son terrier. Cette petite fille appelle sa mère, elle jette des cris d'effroi. La chienne du berger a terrassé le loup.

Agissez prudemment et après avoir réfléchi. Celui qui désire ardemment de s'instruire étudie patiemment, et ne perd aucune occasion d'apprendre. Un enfant ne doit répondre impertinemment.

Le cultivateur a été indemnisé de ses pertes. Cette femme achète des rouenneries. L'Assomption est une fête solennelle. Le cheval pousse des hennissements.

Placez mon livre au dessus du vôtre et le sien au dessous. La sobriété et l'économie augmentent les ressources. L'adversité a reserré l'amitié de ces deux hommes. Il faut oublier les injures et se ressouvenir des bienfaits.

Cet outil est mal emmanché; il se désemmanchera bientôt. Le mois de septembre est le temps de la vendange. Entourez vos parents de respect et d'affection. L'oisiveté amène l'ennui et le travail emmène.

Ennius était un poëte latin fort ancien. Le chrétien pardonne à ses ennemis. Jésus après sa résurrection conversa avec deux de ses disciples sur le chemin d'Emmaüs.

Les montres furent inventées à Nuremburg. Gutemburg est un des inventeurs de l'imprimerie. Memphis est une ville d'Egypte. Rembrandt est un peintre célèbre.

Le chien a brisé son lien. Le chrétien fait le bien pour plaire à Dieu. Les Européens parcourent toutes les parties du monde où ils repandent les bienfaits de la civilisation. Le chiendent envahit les terrains incultes.

L'hirondelle revient au printemps. Elle se souvient du nid qui lui appartient et le retrouve après une longue absence.

3. In the following words: *Agen, Amiens, Benjamin, Marengo, pensum, agenda, appendice, mentor, benjoin, Pensylvanie, Bengale, Rubens, Penthièvre, effendi, spencer.* (Pronounce *a-gin.*)

EIL is pronounced as in *vermeille, conseiller, sommeil, pareil, soleil, méteil.*

EIL, by exception, is pronounced like "*euil*" after "*cu*" or "*gu.*"

Ex.—*Orgueil, recueil, cueillir, accueil, cercueil, je recueille.*

Y placed between two vowels is equivalent to two *i*'s, and should be sounded with each: *Essayer, employer, broyer, effroyable, prévoyance, ennuyer, moyen.* (*Essayer* pronounce *essai-ier.*)

Y, although placed between two vowels, is pronounced as a single "*i*," and syllabises with the following vowel in the following nouns: *Bayeux, Bayonne, Mayence, Cayenne, Bayard, Troyes.* (Pronounce *Ba-yeux, Ba-yonne, Ba-yard, Ca-yenne,* etc.)

OE, by exception, is pronounced "*oi*," as the French say it, in the words *poêle, moelle, moelleux.* (Pronounce *poêle* as if written *poile.*)

UM is pronounced "*un*": *humble, humblement.*

UM is pronounced "*om*" (*ome*) in all Latin words: *Album, dictum, triumvir, circumnavigation.*

Benjamin était le plus jeune fils de Jacob. La victoire de Marengo est une des plus célèbres de l'empire. On appelle agenda une espèce de portefeuille où l'on inscrit ce qu'on doit faire.

Le soleil donne au raisin une couleur vermeille.

L'orgueilleux est insupportable à tout le monde. Le voyageur a reçu un accueil bienveillant. Cueille cette fleur. Notre dernière demeure est le cercueil.

Un coup de tonnerre effroyable retentit pendant l'orage. Tu essayas de broyer un noyau de pêche au moyen d'un marteau. Employez bien le temps; fuyez l'oisiveté.

Le climat de Cayenne est malsain. C'est à Bayonne que l'on imagina l'arme appelée baïonnette. On chargea la pièce de canon avec des Biscayens. Le Chevalier Bayard était le modèle des soldats. Tu as fait le voyage de Bayeux à Troyes.

Le maçon construit un mur en moellon. Mettez la moelle de l'os dans la poêle.

Un esprit humble n'est pas commun.

Le marin a fait don au muséum des curiosités qu'il a rapportées d'un voyage de circumnavigation.

(*To be continued.*)

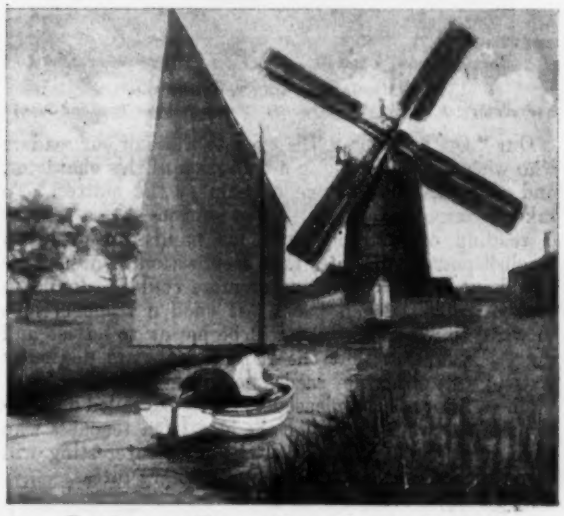
THE PICTURE POST CARD IN THE SCHOOL.

"PICTURE post cards," we read, "are being used in German schools, according to the American Consul at Magdeburg. He says that at a recent meeting of the German Geographical Society the idea was advanced for the first time to employ picture post cards as means of instruction in the schools. The post-card industry has made enormous progress in the last few years, and in the last few months cards have been brought into the market illustrative of natural history, political history, and for use in instruction in the German language, which have met with the hearty approval of professors and teachers of reputation. The school museum at Breslau has undertaken to form a collection of these cards, and for this purpose has requested the various publishers to forward them samples of their output, that it may be determined to what extent they may be used for purposes of instruction. Further, two teachers in Leipzig have established a central bureau for meritorious post cards of all sorts intended for purposes of instruction, collection, and travel."

The idea is not new, for the present writer has already seen the picture post card used to brighten the literature, history, and geography lesson respectively; but the systematic thoroughness indicated in the above, characteristic as it is of our German friends, is not yet in evidence in our own schools.

When we consider the immense amount of intelligent effort which is expended over the publication of the best type of picture post cards, it seems a pity that the school and the scholar should not reap some definite advantage from the taste, ingenuity, and mechanical excellence displayed in their production. It has always appeared to us a matter for regret that these beautiful cards should be sent unprotected through the post; but possibly it is not because they are post cards, but because they are pictures, that they are so widely popular. The proper place for the best of them is an album, and any teacher who is thinking of using the picture post card in school work must first see that each pupil is provided with a strongly-bound album which allows space for notes in connection with each picture.

This, of course, limits the use of the cards to well-to-do schools and upper standards, but there is no reason why a school prize should not occasionally take the form of a post-card album; while the cost of the cards themselves can possibly be defrayed, in the case of



THE STAITHE, HORSEY MERE, NORFOLK BROADS.
(*From the "Oilette" (Coloured) Series—Messrs. Raphael Tuck and Sons.*)

boys, by the coppers which will shortly be diverted from the tills of the purveyors of cheap cigarettes. One penny will purchase a good card, and in a year a collection of a score could be made without much effort—except, of course, in very poor schools.

Let the teacher who wishes to take up the idea begin by taking careful thought. It is easy to err through enthusiasm, and to cause a swift reaction. The central idea of the collection must be definitely fixed—whether it is to illustrate lessons on geography, literature, history, or art. Each card must be carefully selected before numbers are ordered; and the inscription or notes to be inserted in the album ought to be very thoughtfully prepared, in order to sum up, a long time after the lesson has been given, all that the picture is intended to suggest and recall to the mind of the pupil.

St. Michael's Mount, Cornwall.
(From the "Oilette" (Coloured) Series—Messrs. Raphael Tuck and Sons.)

Our "Query Column" is open to those of our readers who wish to begin making a collection of this character, and who wish for advice or help in the matter. To take a concrete example. Let us suppose that a teacher is reading or studying with his pupils six or seven English poems, and feels that a collection of post cards would help the work if one or more could be found in connection with each poem. If such a teacher cares to write to the Editor, he will be happy to advise and suggest, provided that the requirements are distinctly stated; but orders for cards should not be sent.

The Editor will be pleased to receive detailed descriptions of the working out of the idea from teachers who have tried the experiment. The most interesting will be published and paid for at our ordinary rates.

THE BRIGHTEST AND BEST SCHOOL ANTHOLOGY.

"*The Harp of Youth.*"

Edited by W. Jenkyn Thomas, M.A. 288 pages, pott 8vo. Price 1s. 6d. Containing a choice selection of school poetry, arranged in chronological order from Shakespeare to William Watson, and fully illustrated with reproductions from famous pictures, containing about thirty of these valuable aids to literary appreciation.

T. NELSON AND SONS, 35 Paternoster Row, London, E.C.

OBITUARY.

THE LATE MR. C. E. NEVILLE, B.A.

"An educated being is one who feels dependent upon the help of God, independent of the help of man, and incapable of refusing help to man. In other words, an educated being is one who is habitually reverent, self-reliant, and beneficent."—C. E. Neville.

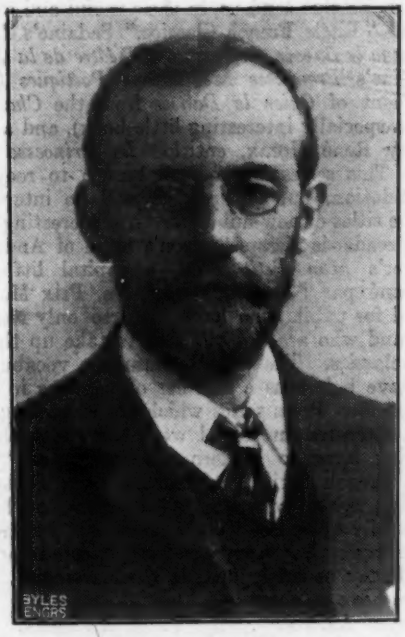
On December 13 last, at the early age of fifty years, Mr. C. E. Neville, B.A., Inspector of Manual Instruction in the North of England, passed away after a prolonged and painful illness borne with remarkable fortitude. His untimely death is a heavy loss to education generally and to manual education in particular.

Mr. Neville was no mere bloodless official. He was an educational enthusiast of the Rooper school. Some twenty years ago he gave up teaching in the neighbourhood of London for an appointment as an assistant inspector of schools under the Board of Education, having been the first to be nominated directly for the post by the Lord President. He came to Bradford in 1885 to join the staff of Mr. T. G. Rooper, H.M.I., and at once devoted himself with marked zeal and ability to the duties of his office. Side by side with his chief he set himself to the great work of improving educational methods. Mr. Rooper unquestionably inspired his subaltern, as indeed he did all who came into contact with him. Mr. Neville gradually became interested in the practical side of education, and, encouraged by his chief, devoted himself almost entirely for a time to the study of educational handwork. Being a student of psychology, it is no wonder that the ideally non-utilitarian system of handwork known as Sloyd captivated his affection.

Twice he visited Nääs to study that system of handwork, and to commune with its high priest, the late Herr Saloman. After his first visit he wrote the book, *The Theory of Educational Sloyd*, which for many years has been a standard work. Let it not be supposed that Mr. Neville was unduly biassed in favour of Sloyd. On the contrary, he studied most carefully all systems of handwork, visiting Germany and other countries for this purpose. It must, however, be confessed that Sloyd impressed him more than other systems, because he, agreeing with many other well-known educationists, found its underlying principles truly educational. To quote from his book: "Carpentry is a trade, and the principles which underlie it are entirely utilitarian, whereas Sloyd is solely a means of formative education. Its purpose is not to turn out carpenters, but to develop the mental, moral, and physical powers of children."

For over ten years Mr. Neville inspected the ordinary subjects in the primary schools of Bradford, Yorks, and district. In 1899 he was selected by the Board of Education to inspect Manual Training Schools, and his duties necessitated his travelling between Birmingham and Berwick. We shall never forget the joy he showed when he was appointed to do the work which he had so near his heart. "I feel now," he said, "that I have at last found my life's vocation." For the cause of educational handwork he always had the zeal of an apostle. During the last nine years he laboured untiringly and with self-sacrificing enthusiasm. With him devotion to the cause was a religion. He was never tired of waging war against

our too bookish education, and believed that half the time of early school life should be spent in some form of handwork; for, as he used to say, "The great men of the past who have done greatest service to mankind



THE LATE MR. C. E. NEVILLE, B.A.

have been the practical men. Forsooth! economical to use books and pictures of things and of apparatus instead of natural objects and actual apparatus. This is false economy. All should use clay, colour, wood, metal, and do garden work."

Abundant testimony is forthcoming of the value of the late Mr. Neville's work as inspector. In all parts of his district his death is mourned, and especially in Bradford and Leeds, where educational handwork is as thoroughly appreciated as in any part of the country.

Whilst the *suaviter in modo* was by no means absent from Mr. Neville's nature, yet it was the *fortiter in re* that impressed one. His pronounced opinions, scrupulous conscientiousness, marked force of character, and persistent educational enthusiasm won for him wide respect and admiration after he had lived down the unpopularity which at the outset falls to the lot of all reformers, however discreet.

As a social reformer he was an active worker, and, busy man though he was, he found time to undertake and effectually carry out many onerous local duties. More especially he interested himself in the welfare of the young men of the town in which he lived, and helped materially to inaugurate and keep going various societies for that end. On Monday, December 16, 1907, he was laid to rest in Nabwood Cemetery, Shipley, amid many marks of respect. There in his sheltered grave looking towards the wood, surrounded by the trees he loved so much, his body lies sleeping in trust. He leaves a widow and two children and a multitude of friends to mourn his loss.

We who were privileged to come into close contact with Mr. Neville and to count him as a personal friend know that he was no common man. His friendship was something which helped to make life worth the living. The grip of his hand stirred one's soul, and was eloquent of kindliness, a kindliness that never cooled. His physique, which was never robust, was galvanised by powerful purpose and girded by a forceful mind. His tastes were simple but artistic, and he hated veneer of all kind.

His cheery optimism in sickness, of which he had more than his share, and his humorous temperament carried him through many difficulties with a minimum of friction and much of success.

Manual education has lost an "able advocate," manual teachers have lost an ardent colleague and cautious guide, and his nearest friends have lost one whose place will be hard to fill. But his example remains, and he has left his mark in the educational field and on the hearts of many friends.

THE LATE MR. W. H. THOMAS, B.Sc.

THE Editor regrets to announce the death of one of his most valued contributors, Mr. W. H. Thomas, B.Sc., of the Royal College of Science, who passed away on the day of publication of our last issue. Mr. Thomas was the second son of Captain William Thomas of Lindal-in-Furness, and was born on February 22, 1845. He received his general education at Ulverstone Grammar School, and his special scientific training at the Royal College of Science and Royal School of Mines, London. He graduated at London University, taking the B.Sc. degree with first-class honours.

For some years he was associated with his father in the management of the hæmatite mines at Lindal, but his tastes were more in the direction of purely scientific work, especially in connection with chemistry and mathematics. He became science master of Bishop's Stortford Grammar School, and afterwards at the Wesley College, Sheffield.

About eight years ago he was appointed to assist in the mechanics and mathematics division of the Royal College of Science, an appointment which he held until his sudden death on March 25.

THE LATE MR. W. H. THOMAS, B.Sc.

During the last eight years Mr. Thomas has worked in connection with the "Query Column" of the *Practical Teacher*, contributing replies in pure and applied mathematics. Towards the end of January of this year he fell ill under a severe attack of influenza, and the after effects of this illness left his heart very weak. He had returned to his college work, and had written out an answer for our "Query Column"—that in reply to *Student*—on the very evening which proved to be his last. Early in the morning of March 25 he passed away quietly in his sleep, without any warning that his end was so near.

The Editor's Bookshelf.

NEW PUBLICATIONS FOR THE TEACHER AND STUDENT OF FRENCH.

JUDGING from the number of French "courses," grammars, and texts which pour in a continual stream from certain educational publishing houses, the study of this language must be advancing by leaps and bounds. Yet one does not find much evidence among educated circles that the speech of our good neighbours is either understood or greatly appreciated. It is to be hoped that at least the French lessons of our schools and colleges are providing good mental discipline.

Mr. Edward Arnold has recently issued a graduated series of *Lectures Françaises* in four volumes, beautifully printed, and illustrated with reproductions from more or less famous paintings representing scenes from French life and French history. The two early volumes are from the pen of Miss Jetta S. Wolff, to whom the lower-form pupil owes a good deal more than he will ever understand or acknowledge; while the remaining volumes are edited by Dr. Gerothwohl, and consist of collections of standard passages from French authors modern enough to avoid the archaic or old-fashioned expressions which so often cause unnecessary trouble to the young student of French. The series is well done, and ought to prove highly useful. Each of the first two volumes is furnished with a French-English vocabulary.

One of our own contributors, Mr. S. A. Richards, has issued, through Messrs. Dent and Co., a small volume entitled *French Speech and Spelling*, which is to form a "First Guide to French Pronunciation." In the hands of a good teacher this useful and up-to-date little book, used for purposes of class drill, ought to prove exceedingly useful. Messrs. Savory and Jones have translated M. Paul Passy's *Sons du Français*, and issued the work through the Clarendon Press under the title of *The Sounds of the French Language*. This is described by the author as a "popular work on scientific lines," and, further, as "an elementary work intended for teachers and advanced students of French." All those who are interested in phonetics would do well to see this new issue.

From the Omega Press, Oxford, comes Heath's *Practical French Grammar*, which is more than its title implies, as it contains exercises and vocabularies on the lines of the French "course," and is therefore specially suitable for the use of private students who have not the advantage of daily supervision by a master. The book is "practical" in that it aims at equipping the student with a working knowledge of present-day French, and it contains an appendix explaining the bearing of the deviations permitted from commonly accepted rules of grammar as set forth in the decree of 1901. From the same Press we have received a *Practical French Reader*, containing "a collection of graduated extracts and a correct translation of phrases that would prove difficult to the beginner," with a full vocabulary of words and phrases based entirely on the text. The *Practical French Composition* of the same firm contains a graduated series of English passages—standard English by foremost modern writers, for the most part—with useful aids to translation.

Messrs. Blackie send us, in their useful and attractive series of "Little French Classics," Sedaine's *Le Philosophe sans le Savoir*, Souvestre's *Théâtre de la Jeunesse*, Lamartine's *Premières Méditations Poétiques* (a prose abridgment of *Ogier le Danois* from the *Chansons de Geste*—a specially interesting little book), and a modern story by René Morax, entitled *La Princesse Feuille-Morte*. This series is too well known to require our commendation, but our readers will be interested to learn the titles of new numbers. An interesting modern French reader is Messrs. Nelson's issue of André Lichtenberger's *Mon Petit Trott*, a capital little story, "couronné par l'Académie française, Prix Montyon," intended for pupils who have hitherto only read short pieces, and who are not yet able to take up the easier French classics. The volume contains a vocabulary.

We have before us a number of volumes in each of two Clarendon Press series which are attracting a good deal of attention in school work. Perhaps the more interesting issue to modern readers is the "Oxford Modern French Series," edited by Leon Delbos, and containing works by writers whose style and language are naturally quite free from archaisms. Further, each of these books has been carefully selected for school use, and may be safely used in the classroom. In this series we have received :—

Mélanges Littéraires. By T. S. Andrieux. Edited by E. C. Jones. Plays and poems, including the famous *Moulin de Sans-Souci*.

Le Roman d'un Jeune Homme Pauvre. By Octave Feuillet. Edited by J. Laffitte. The story of a nobleman in disguise.

La Jeunesse de Chateaubriand. Edited by Gerald Goodridge. The early days of Chateaubriand, written by himself.

Servitude et Grandeur Militaires. By Alfred de Vigny. Edited by C. L. Freeman. Stories and impressions of a soldier's life.

Les Fiancés du Spitzberg. By Xavier Marmier. Edited by A. A. Hentsch. The tale of a voyage to the whaling-ground of Spitzbergen.

Journal d'un Voyage aux Mers Polaires. By Lieutenant René Bellot. Edited by H. J. Chaytor. With a map. An account of Lieutenant Bellot's voyage in the *Prince Albert* in search of Sir John Franklin's polar expedition.

The other set of volumes is that known as the "Oxford Higher French Series," also edited by Leon Delbos, and intended for upper-form pupils and private students who can read advanced French. The series embodies an attempt to provide annotated editions of books which have hitherto been obtainable only in the original French texts, and the publishers have produced volumes which it is a pleasure to read and handle. The series includes selected works of Madame de Staël, Madame de Girardin, Daniel Stern, Victor Hugo, Lamartine, Flaubert, Gautier, and others whose names are a sufficient guarantee of literary excellence.

HOLIDAYS AT HOME.

We have been reading a small book, entitled *Pictures of Travel*, by T. M'Callum, which drives home the neglected idea that for recreation, both mental and

physical, there is no necessity to cross "the narrow seas." Many of our London readers who hasten to the Continent as soon as the autumn holiday begins would be well advised to start from one of the northern termini and explore the foreign regions of Scotland. If any should be trembling on the brink of indecision in this matter, we recommend them to read Mr. M'Callum's interesting and attractive descriptions, which in style and contents are far removed from the ordinary guide-book matter. Mr. M'Callum is always within hail of a poet of repute, and his little book shows incidentally how many of our great writers have been inspired by the scenes which he describes so well. We note that the book is to be obtained from the author at 99 East Dulwich Grove, London, S.E., and that the price is sixpence.

THE STUDY OF WORDS.

The Very Rev. James Mitchell, D.D., has written a book on etymology on original lines. Its full title is *Significant Etymology; or, Roots, Stems, and Branches of the English Language*, and the novel treatment consists in the arrangement of the words in groups, according to the different subjects of which they treat, as, for example, "The Heavenly Bodies," "The Earth," "Man in General"—his bodily structure, his food, clothing, mental faculties, social institutions, observances, etc. One of the advantages claimed for this method of relating the words is that it awakens a special interest in them, and thus invests a naturally dry subject with a fresh charm and a deeper meaning. It may be said therefore that the volume is one for all intelligent and thoughtful men and women who are interested in their own language. The publishers are Messrs. Blackwood, and the volume is well got up. All our readers interested in the New English Movement are recommended to consult this work.

A WELCOME RE-ISSUE.

Messrs. Constable and Co. send us two parts of Miss Kate M. Warren's *Treasury of English Literature*, the first covering the period from the beginnings of our literature to the eleventh century, the second covering that between 1200 and the Age of Elizabeth. The volumes are issued at the truly marvellous price of one shilling each, taking into consideration the style of production, which is tasteful in the extreme. The whole work was arranged, as our readers may be aware, to form an illustrative companion to Mr. Stopford Brooke's famous *Literature Primer*, which some of us have by rote. We heartily wish that such a work as Miss Warren's had been available when we set, in years now long gone by, to commit to memory the excellent opinions on the great works of our literature given by the author of the immortal *Primer*.

TWO INDISPENSABLE HANDBOOKS.

Messrs. Swan Sonnenschein and Co., Ltd., send us (1) *The Public School Year-Book* and (2) *The Schoolmaster's Year-Book and Directory*—guides respectively to the Upper and Lower Houses of the educational world.

The former contains, besides particulars of the public schools, a large amount of systematised information which will prove useful to those parents who are faced with the serious and insistent query, "What shall we do with our boys?" A specially interesting chapter deals with "Colonial Openings for Public Schoolboys," and another with "Agriculture and Horticulture," with particulars of courses in the eleven university colleges which include the subject in the curriculum.

The latter volume is exceedingly comprehensive. It would be difficult to imagine any branch of educational activity which is not adequately dealt with in its pages.

A New Self-Help. By Ernest A. Bryant. (*Cassell & Co., Ltd.*)

This is a book which would make an excellent gift for an upper standard boy, as it is a first-rate comment on the inspiring couplet—

> "Lives of great men all remind us
> We can make our lives sublime."

It is described as "a story of worthy success achieved in many paths of life by men and women of yesterday and to-day," and it is brightly written, as well as imbued with that loftiness of purpose which can readily distinguish the success which is not moral and spiritual failure.

A Book of Birds. By W. P. Pycraft, A.L.S., F.Z.S. (*Sidney Appleton, London.*)

This forms one of the series of "Sidney Appleton's Popular Natural History Books." It appeals to the general unscientific reader rather than to the student, and is for this reason the more likely to be of use to young naturalists in giving them an interesting introduction to bird life, while not repelling by a multitude of details. The selection seems based on sound lines so far as concerns the needs of young readers, special attention being given to the birds of Great Britain and Europe, while only the more striking or remarkable specimens of foreign lands are included. The descriptions are concise, and, though short, not uninteresting. The numerous coloured illustrations are of special value, though in many instances the colour seems unduly pronounced if not exaggerated, each of the thirty plates showing from five to ten separate examples.

Plant Biology. By F. Cavers, D.Sc. (*Lond.*), *A.R.C.Sc., F.L.S., Professor of Botany, Hartley University College, Southampton.* (*W. B. Clive.*)

This new book, published by the University Tutorial Press, Limited, will be welcomed by teachers dealing with botanical biology. The author has evidently been accustomed to treating the subject in a thoroughly practical way, and the book is the outcome of a considerable amount of work with students in the classroom and laboratory. Students of botany are very often handicapped by ignorance of the elements of physics and chemistry underlying much of their work in the physiology of plant life. This difficulty has been met in this book by the wise introduction of pages dealing with the physical and chemical properties of air, water, and soil. The book is well written, and deals largely with plants which can easily be cultivated or obtained by the student. The ground covered is suitable for the Oxford and Cambridge Local Examinations, London Matriculation and the Board of Education Examinations. The diagrams and illustrations are good, and the paper and print in keeping with other volumes in "The University Tutorial Series."

Pages choisies des grands Écrivains. Marivaux. (*Armand Colin, Paris.*)

This latest addition to the series now being published by M. Armand Colin fully maintains the standard reached by the selections which have preceded it. Marivaux is in every way worthy to be reckoned amongst the greatest writers France has produced. Against his style his contemporaries could only allege that he might have taken a little less trouble over it, and posterity has found that it defies analysis to such an extent that it has been forced to invent the word *marivaudage* to represent it. With a style excelling in harmony, in beauty of form, and in that crystalline limpidity which distinguishes French prose, it is a pure delight to read Marivaux. Singularly enough, however, that lack of abandon and that minute care which were alleged against Marivaux by the critics of his time lead him occasionally, but only very occasionally, to write curiously involved sentences, which stand out in sharp contrast to the rest of his writing. The extracts are excellently chosen. They represent the best part of his work, and give a good idea of his varied literary activity. The literary introduction by M. Francisque Vial is a splendid piece of criticism, and very helpful to the reader of the book.

Our Students' Column.

THE STUDENT-TEACHER AND SCHOOL PRACTICE.

BY W. MACPHERSON, M.A.

[As our readers are already aware, we do not now attempt in this column to prepare student-teachers for the various professional examinations. We are of the very decided opinion that every student-teacher ought to have the inestimable advantage of personal tutorial guidance either in a secondary school or college, or, if this is impossible, in connection with a properly managed correspondence class under a tutor who takes the trouble to study the individual requirements of his students.

There are, however, several ways in which a magazine like the *Practical Teacher* can supplement the work of the tutor. It can, and does, supply information which, from the nature of the case, cannot be obtained from any text-book, such as Mr. Wethey's "Geography Notes Up-to-Date," which, carefully studied for a year, would render the student capable of facing any modern geography paper with equanimity. It can, and does, provide model notes of lessons and schemes of work, such as are repeatedly asked for in papers on school management, as well as hints on improved methods in all branches of the school curriculum. It would not be difficult to show how almost every page of the *Practical Teacher* could be utilised by the intelligent student for examination purposes.

But we propose to continue offering him special help in Our Students' Section by the publication of papers bearing upon his work both as a student and as a teacher, and by offering prizes for good work done during the work of preparation for his professional examinations. As the year's work at school, centre, or with a correspondence tutor goes steadily forward, we shall publish topical papers, such as that immediately following, containing help, guidance, suggestions, and encouragement, and each month a prize of half a guinea will be offered for a good piece of work done in class.]

I.

The Relation between Study and School Practice.

IT is an interesting question to ask what is the relation between the aptitude and success of a student-teacher in his theoretic studies and his skill and success in the practical work of teaching? Does a student who excels in his work as a *pupil* in the centre or secondary school usually show promise in his work as a *teacher* when engaged in school practice in the elementary school?

From whatever point of view we consider the question—whether from an *à priori* standpoint or from the standpoint of actual experience of student-teachers' work—the conclusion that must be reached seems to be that there is a close relation between aptitude in theoretic studies and ability in teaching, and that, as a rule, the good student is also a good teacher.

In the first place, that intellectual quality which is most important to success in study is the most important also to success in teaching. It may be described generally as the quality of method. So essential is this quality, alike in study and in teaching, that every student-teacher, at the outset of his career, should consider carefully wherein it consists, and how it may be cultivated successfully.

OF SOUND METHOD IN STUDY AND IN TEACHING.

The fundamental aim of method in teaching should be to present the matter of every lesson in a systematic fashion, and it is the characteristic of a system that each part of it can be understood only through its relations to the other parts and to the system as a whole. It does not matter at what stage of education the pupil may be, whether he is in the first standard or the sixth, in every case the essential principle of sound method is the same—relate and unify; and, *vice versâ*, the fundamental error in bad method is the not doing of this—that is, the presentation of the subject-matter of a lesson in a disconnected and unsystematic fashion. And this holds true not only of teaching, but also of theoretic study and knowledge generally: the good student in a subject is one who realizes clearly the relations existing between each part of it. And in written exercises, no matter what the particular subject under consideration may be, it will be found that the chief fault which mars the performance of the unsatisfactory student is desultoriness of thought and treatment, and lack of the sense of connection and coherence.

A PRACTICAL CONCLUSION FOR STUDENT-TEACHERS.

A close relation, then, exists between the fundamental intellectual quality required in study and the fundamental intellectual quality of good teaching. A practical inference which may be drawn from this by the student-teacher is that throughout the period of his training—both during his apprenticeship and later, if he obtains a place in a training college—he should devote himself assiduously to his theoretic studies, feeling sure that thereby he will be increasing his aptitude for the work of his life as a practical teacher.

BUT—

We must admit that unsatisfactory students have sometimes seemed to be successful in school practice. Personally, I have known in a training college students whose work in class and in examinations was unsatisfactory, and who yet were successful in giving lessons and in managing children. But in every such case the class-work of the student was unsatisfactory, not because he lacked the capacity for method, but because he was too indifferent or too careless or too lazy to apply it. In view of this fact, the practical conclusion which we have stated above only gains in significance and emphasis; for this indifference and carelessness, while perhaps not affecting the conduct of particular lessons given in the course of school practice, where a special effort and care were necessary, would be bound, if continued, to affect the student's success in practical teaching. The continuous neglect of method in the sphere of study would inevitably lead to its neglect in the sphere of teaching, and to the gradual loss of such aptitude as the student might previously have possessed

OF INSIGHT IN TEACHING.

Again, it has to be admitted that one has known pupils whose work in class and in examinations has been satisfactory, while their work in school practice has been weak and defective. The reason of this is that other qualities than the intellectual quality of method go to the making of a good teacher. Perhaps the chief of these is the capacity for sympathy and insight. The good teacher is one who has a faculty for selecting in a subject just those points which will be of interest to his pupils at their particular stage of development, and which, at the same time, are most important to an adequate comprehension of the subject. In some exceptional instances it is found that a methodical disposition of mind is accompanied by a lack of insight and sympathy; but to this statement it must be added that the cultivation and practice of method in study and in teaching is likely to stimulate and develop the quality of insight. At the same time, it must also be granted that, as a rule, only after a long experience of work in the classroom, by a continuous observation of the interplay of the teacher's and the pupils' modes of thinking, is this quality developed. In the student-teacher's training only a beginning can be made in the cultivation of quick insight into the nature and needs of children; and it is only in the practical part of his course, in the elementary school, that the beginning can be made. From this circumstance the student-teacher may infer

ANOTHER PRACTICAL CONCLUSION—

namely, that while he should do everything in his power to develop the quality of method, alike in his studies and in his teaching, he should also, during his attendance at the elementary school, study carefully the means whereby he may cultivate to the best advantage the quality of insight into and sympathy with the minds of children.

II.

General Preparation for School Practice.

The first point to which the student-teacher may usefully direct his attention, on entering a school for the purposes of observation and practice, is the examination of the school course or curriculum. On the first day of his attendance he should study attentively the scheme of work and the record-of-progress book. If he is able to make a copy of the former, he will find that this may be useful to him in his later career as a teacher. Unless this preliminary study be made, when the time comes for him to give a particular lesson he will find it difficult or impossible to treat the subject in such a manner as will carry on the work of the class continuously and effectively. Later on he will be required to make notes of lessons, and these should be entered on the right-hand pages of his manuscript book: the other pages should be reserved for comments upon the lesson after it is given. The last point is important. A student of teaching will benefit greatly from the habit of observing, and writing his observations upon, the effect of his lessons on the pupils. He will thereby be aided materially in developing the qualities of sympathy and insight of which we have spoken. A difficulty which is met with at first in this work arises from the student-teacher's not being aware of the particular features to which he may advantageously direct his observation. Often he may usefully classify his comments upon a lesson under a few definite heads: for example, (1) the subject-matter, paying special attention to its suitability or otherwise in relation to the class; (2) the treatment (were you able to carry out the lesson in the way you had planned it, or was some modification necessary?); (3) the effect on the class (were the pupils interested, attentive, and responsive? and if they were not, to what do you attribute their want of interest, attention, and response?); (4) suggestions for the conduct of similar lessons in future.

III.

Some Typical Difficulties in the Conduct of a Lesson.

In the actual giving of lessons the student-teacher will encounter many difficulties which he must make it his business to surmount. In the space at my disposal it will be impossible to do more than touch upon a few of these; and the difficulties I have selected for brief treatment are those which I have found, by personal conversation with student-teachers on the subject, to be felt most keenly and most widely.

A difficulty which has been mentioned to me by many student-teachers is that the matter which they have prepared for a lesson is often exhausted before the end of the time allotted. In many cases this is caused by the teacher's using too exclusively the method of demonstration and exposition—that is, he *tells* the class most of the facts of the lesson, and does not, by using the method of question and answer, make the pupils discover them. The "heuristic" method, as it is called—the method which aims at the discovery of knowledge by the exercise of the pupils' own faculties—is a much slower process than the method of demonstration. Another cause which leads to the premature exhaustion of the subject-matter is the lack of a sufficient number of illustrations and examples. These always add to the interest of a lesson, and, if they are well selected, lend themselves readily to treatment by the method of question and answer. Again: every lesson should be accompanied by an adequate blackboard summary, which should show clearly the main heads of the subject-matter. The headings may generally be suggested by the pupils themselves, and (an operation which will take time) written down as the lesson proceeds. And at the end of a lesson there should always be revision of the subject-matter, the revision being conducted by the aid of the blackboard summary.

Another fault which the supervising teacher frequently finds in lessons given by student-teachers is the inclusion of too much matter in a single lesson. On first consideration it would seem to be contradictory that this fault should co-exist with the defect previously mentioned; but it is not really so, and indeed the two defects are in a large measure due to the operation of the same causes. In giving a lesson to young pupils, the amount of new subject-matter introduced should be small. If, however, the method of *telling* is resorted to unduly, the tendency is to tell too much, to introduce too many new facts; whereas, if the slower process of suggestion and discovery through particular examples be used, the amount of new subject-matter introduced will be restricted within due limits. In preparing his notes of the lesson, the teacher should write down, under headings, the chief points of the subject-matter, in a form similar to that in which they will appear in the blackboard summary. He will thus be enabled to judge beforehand, with more or less accuracy according to the extent of his experience and insight, whether the weight of the subject-matter be just or excessive.

A third difficulty which has been mentioned by student-teachers is that of giving a lesson without referring to the notes which have been previously prepared. Where this difficulty is met with in any great degree, it is generally due to the student's lack of method in his comprehension of the subject-matter: the different parts of the lesson are conceived as co-existing separately, not as following one another in an orderly and connected sequence. When the notes of a lesson have been carefully prepared, one part of the subject-matter leads on naturally and inevitably to the following part, and the association of related ideas enables the teacher to go through the lesson continuously and without a hitch. In this matter, however, as in all the others upon which we have touched, it is undoubtedly only practice that will lead towards perfection. Needless to say, the limited opportunities for practice which are afforded the student-teacher will not enable him to reach perfection (the true artist, indeed, never reaches that height); but if he uses his opportunities aright he may learn much that will be useful to him later in his practice of the difficult art to which he has devoted himself.

PRIZE COMPETITION.

In connection with the above article, we have much pleasure in offering for competition among pupil-teachers and training-college students a prize of *Half a Guinea* for the best notes of a lesson. In accordance with our intention of arranging such competitions as will assist students in their ordinary courses of instruction at school or college, we leave to each competitor the selection of the subject of the lesson submitted. He may, if he please, submit the notes of a lesson which he has actually given in school practice, and in that case he may add brief comments, on the lines suggested in the above article, regarding the effect that the lesson produced when it was given, though this is not essential. In every case the notes should be prefaced by a statement of (*a*) the aim of the lesson, (*b*) the standard for which it is intended, (*c*) the time allotted for the lesson.

HELP FOR CERTIFICATE STUDENTS.

ENGLISH.

IN addition to Shakespeare's *Richard II.* the following essays by Bacon are set for detailed study—Of Parents and Children; Goodness and Goodness of Nature; Nobility; Seditions and Troubles; Wisdom for a Man's Self; Riches; Nature in Men; Ambition; Anger; Vicissitude of Things.

The life of Bacon should be prepared in connection with the history as well as the literature.

Many people attempt to write essays without realising the exact modern meaning of the term, and its connection with the original signification. A moment's consideration of the kindred words "to essay" and "to assay" brings out the fact that originally an essay was a trial or examination of some subject. The name now signifies a short but complete prose composition, setting out in the writer's best style his thoughts or opinions on a certain topic. It may be argumentative, but generally the composition which seeks to give a logical proof of the points touched upon is called a treatise or tractate; and one in which the writer sets out the results of his original researches into the hidden mysteries of nature and science, is called a "monograph."

The French writer Montaigne is regarded as the originator of the essay; he was the first perhaps who wrote on philosophical subjects in a chatty way so as to interest and instruct those who were not philosophers. Bacon apparently got his idea from Montaigne; but his essays differ widely in style from those of Montaigne. After Bacon there were many English essayists, as Sir Thomas Browne and Dryden, but this form of composition was developed and brought to perfection by Addison and Steele. The student will do well to compare one of the essays of Addison or of the more recent writers, such as Charles Lamb or Leigh Hunt, or the learned essays of Macaulay, or the literary essays of Hazlitt or Charles Kingsley, with one of the essays of Bacon. He will feel that, while the latter writer evidently took pains to polish his individual sentences and to make them as crisp and pointed as possible, yet the essay as a whole has not been drawn up on such a careful plan. It seems to reveal, in fact, the use of the pocket-book for entering up thoughts just as they occurred to the writer. One feels the want of more smoothness and vivacity. Although Bacon wrote with much wit, he did not write as if at ease. As a result the essays seem to be rather a collection of maxims or aphorisms, and to lack coherence. This very terseness of expression, however, seems to give more weight and authority to the work, and few books are more often cited, and few books of this type have been more generally read. As a moralist Bacon has often been compared to Seneca, whose works he had studied and sometimes imitated, and, like him, he regards the moral world from the outside. He is less sarcastic than Machiavelli, with whom he has often been compared; but he still treats worldly success as the chief aim of the virtuous man, and as the measure of conduct. He, however, attaches considerable importance to the sanction of religion, and feels a profound pity for the ignorance and folly so common among men.

Bacon's essays are often very difficult to analyse, and seem to be the development of collections of maxims. As the number to be prepared is small, the student should read them over and over until they are known almost by heart. As an aid to remembering them we shall give a short analysis of each, as well as explanatory notes.

ESSAY VII. "OF PARENTS AND CHILDREN."—1. Advantages and disadvantages of parentage. (*a*) Joys and sorrows are intensified by the thought that others are affected; (*b*) family cares are a hindrance to public work.

2. Mistakes made by parents in dealing with children. (*a*) Difference in affection; (*b*) illiberality; (*c*) creating and breeding an emulation; (*d*) unwise choice of vocation.

Nor will they not utter. In Early English two negatives did not make a positive, but a more emphatic negative.

Mitigate the remembrance of death. Lat. *mitis* = gentle. "Mitigate" therefore means to render less severe or painful. Remembrance here means the repeated thought, not the recalling of a previous experience.

The third sentence of the essay is open to serious discussion, for although we may admit that a good man's memory may be kept green by his good works instead of by his descendants, yet it is open to question whether "the noblest works and foundations have proceeded from childless men." Note the paradox at the end—"the care of posterity is most in them who have no posterity." A childless man might bequeath all his money to a hospital or other similar institution, not because he wished to benefit posterity, but simply because he had nobody to whom to leave his wealth.

Several = different, or separate. The use of the word in the sense of numerous is quite a modern one.

A wise son, etc. This is from Prov. x. 11, and Bacon evidently reads into the proverb a meaning which was not intended; for in *De Augmentis* viii. he refers to it again, and says definitely that a well conducted and wise son is more valued by his father than by his mother, while a wicked son causes more shame and sorrow to his mother than to his father. But surely a mother's joy and delight at the creditable conduct and success of her son are quite equal to her husband's, and a father's feeling of shame and sorrow at his son's disgrace is no less real and bitter than that of his wife, although he may have more strength to conceal it.

On the question of illiberality the error lies in the excess. Children are spoiled both by having too much and by being allowed too little. A parent's judgment is shown when he hits the happy medium.

Emulation. A similar remark applies to emulation. A little friendly rivalry is a good thing; it is the excess that causes discord.

Optimum elige.....consuetudo, "Choose what is best; custom will make it pleasant and easy." The maxim seems sound, but without a standard to decide what is best the advice is useless. Bishop Jeremy Taylor, in *Holy Living,* ascribes a similar precept to Seneca.

Elige optimam vitam, consuetudo faciet jucundissimam, "Choose the best life; custom will make it the most pleasant." Bacon probably quoted from Plutarch (*De Exilio,* c. 8), where the advice is given as a saying of Pythagoras.

CLOUGH'S CORRESPONDENCE COLLEGE,

TEMPLE CHAMBERS, LONDON, E.C.

THE OLDEST AND MOST SUCCESSFUL CORRESPONDENCE COLLEGE.

P.T. ADMISSION EXAMINATIONS.

Also Class Preparatory to the Preliminary Certificate Course.

PRELIMINARY CERTIFICATE,

DECEMBER 1908—MARCH 1909.

*** Clough's Preliminary Certificate Class provides the best possible preparation for this important Examination.

Valuable Scholarships & Prizes for Specially Successful Students of Clough's Preliminary Certificate Class for 1909.

CERTIFICATE, DECEMBER 1908.

To secure admission immediate application is necessary.

CERTIFICATE, DECEMBER 1909.

Intending Students are advised to commence without delay.

MATRICULATION.

Classes for the JUNE 1908, SEPTEMBER 1908, JANUARY 1909, and JUNE 1909 Exams.

A.C.P.

Classes for the SEPTEMBER 1908 and DECEMBER 1908 Examinations.

OXFORD AND CAMBRIDGE SENIOR LOCALS.

Classes for the JULY 1908, DECEMBER 1908, and JULY 1909 Examinations.

Remarkable Record of Success.

At the Preliminary Certificate Examination, Dec. 1906—April 1907,

225

CLOUGH'S STUDENTS gained

302

DISTINCTIONS.

Four years in succession, 1902–3–4–5, Students of Clough's Scholarship Class were placed in **Division I. of the First Class,** and besides the remarkable successes of the past five years, the following distinguished positions on the Scholarship List have been taken by Clough's Pupils: Nos. **1, 2** (three times), **3, 4, 6** (four times), **7** (twice), **8, 9** (twice), **10** (three times), and many others in the First Hundred.

£400 in Scholarships and Prizes awarded.

Certificate, July 1903.	99	Clough's Students were placed in the	FIRST CLASS.
Certificate, July 1904.	110	Clough's Students were placed in the	FIRST CLASS.
Certificate, July 1905.	196	Clough's Students were placed in the	FIRST CLASS.
Certificate, July 1906.	276	Clough's Students	OBTAINED DISTINCTION IN 390 SECTIONS.
Certificate, Dec. 1907.	320	Clough's Students	OBTAINED DISTINCTION IN 455 SECTIONS.

*** *These are* ***bona fide*** *successes. Names, Addresses, and Distinctions have all been published. No other class can show anything approaching this record of success.*

For Prospectus, Syllabus, and full particulars of any of CLOUGH'S CLASSES (P.T., PRELIMINARY CERTIFICATE, MATRICULATION, CERTIFICATE, A.C.P., OXFORD and CAMBRIDGE Senior Locals, etc.), write at once to—

THE SECRETARY, Clough's Correspondence College, Temple Chambers, LONDON, E.C.

Younger brothers.....disinherited. This should properly follow immediately on the paragraph on the "difference in affection."

ESSAY XIII. "OF GOODNESS AND GOODNESS OF NATURE."—1. The nature of goodness. (*a*) Its relation to humanity, charity, etc.; (*b*) it "admits no excess but error;" (*c*) it is inborn in man, and must find an object.

2. Dangers to avoid in exercising goodness. (*a*) Seek the good of other men; (*b*) bestow appropriate benefits; (*c*) in doing a present service do not sacrifice the power to do good in the future.

3. "On the other side there is a natural malignity."

4. "The parts and signs of goodness." (*a*) Courtesy to strangers; (*b*) compassion towards the afflicted; (*c*) forgiveness; (*d*) gratitude; (*e*) perfect self-sacrifice.

Affecting of the weal. Loving the welfare.

A little too light. It is interesting to compare the corresponding words derived from Greek and Latin. It will often be seen that the Greek has a wider and deeper meaning than the Latin: compare *sympathy* and *compassion*.

No excess but error. At first sight it seems as if error is one form of excess, but Bacon meant to say, "admits no excess but (does admit of) error." That is, a person could not have too much philanthropy, but he might direct it towards an unworthy object.

Busbechius was a celebrated diplomatist who was sent as ambassador to the Sultan Soliman the Second at Constantinople by the Emperor Ferdinand the First.

Machiavel. Machiavelli was a statesman and historian of Florence, born in 1469. When the Medici recovered the chief power in Florence (1512), Machiavelli was banished. He was afterwards arrested and tortured. He was liberated, and lived in retirement for eight years, during which he wrote several books, the chief being called *Del Principe*. It is a political work, and is regarded as one of the world's great books. It argues that the prince should seek to further his own interests in every way, and hence the methods sometimes adopted by rulers in accordance with his teaching are spoken of as "Machiavellian."

Æsop's cock, an allusion to the well-known fable of the cock which found a gem, and regretted that it was not a grain of corn. See also Matt. vii. 6. "Cast not your pearls before swine."

Portraiture..... pattern. If the mould or pattern be broken, no further portraitures or copies can be made.

Mere mischief, pure mischief, unalloyed evil spirit.

In season, "at home," delighted, in their element.

Still, for ever, always. Compare

> "Let's make some pretty match with shedding tears;
> As thus:—to drop them *still* upon one place."
>
> *Richard II.*

As Timon had. See Shakespeare's *Timon of Athens*, V. ii.

Knee timber, timber with a natural bend in it.

The noble tree. The myrrh tree and others give out a good and useful juice when they have been wounded.

Anathema, a curse. This last passage is very fine.

ELEMENTARY SCIENCE.

Notes of lessons on substances of biological importance (*continued*).

V. GLUTEN.

A. *Preparation.*—Remind the class of the lesson on starch, and repeat the experiment then worked—namely, mix some wheat flour to a stiff dough, tie it in a linen cloth, and knead it under water so as to work out all the starch, which can be neglected, as it is the substance left in the cloth that we wish to study now.

B. *Presentation.*—The tough, yellowish-gray substance left in the cloth is called gluten. It can be drawn out into long threads, which are seen to be somewhat elastic. It really consists of a mixture of several closely allied bodies, the two chief of which are called gluten-fibrin and gluten-casein. It is this substance which enables a mixture of flour and water to bind together and form dough, which can be made to enclose multitudes of small bubbles of gas which expand with a gentle warmth, forming a light "sponge," which hardens with the heat of the baking oven and forms light bread.

Gluten is not only of physical use in bread-making, serving to hold in the bubbles of gas which make the bread light, but it contains a good quantity of nitrogen, and forms a very necessary and valuable part of our food. The presence of nitrogen in gluten may be shown by mixing it with lime or caustic soda. On heating the mixture ammonia will be given off, which may be detected by its smell.

Considerable quantities of gluten and related nitrogenous bodies are found in the flour of wheat (10 to 13 per cent.), in oatmeal (14 to 16 per cent.), pearl barley or barley meal (6 to 7 per cent.), and rye flour (8 to 10 per cent.). It will be seen that the two latter are deficient, and light porous bread cannot be made from them. Rice and maize are also deficient, and the preparations of maize, such as "cornflour" and "oswego," contain very little indeed; the latter contains 1 per cent., while the former is practically pure starch. They cannot therefore be regarded as perfect foods, although they are very good when used with nitrogenous matter such as milk or meat.

On the other hand, pease, beans, and lentils contain a very high percentage of nitrogenous material, but it is chiefly legumin, and not gluten. Hence if some pea flour or bean meal be mixed with water, it will not bind together in a tough elastic dough, and hence could not be used for making a light loaf.

C. *Formulation.*—Gluten is an important nitrogenous substance found in the meal or flour of wheat, oats, and some other grains. It is elastic and sticky, hence its name. It is a valuable food constituent, and gives that consistency to dough which enables it to form light bread.

D. *Association.*—Apply the test for nitrogen given above to the following substances—cheese, starch, butter, and lean meat. Note which articles of food are taken to give us the necessary supply of nitrogen.

E. *Application.*—Write an account of the preparation and properties of gluten.

VI. FATS AND OILS.

These important substances are not mentioned by name in the syllabus, but it is very desirable that their exact nature and composition should be understood.

A. *Preparation.*—The class should have an elementary knowledge of inorganic chemistry, so as to understand the nature of an acid such as nitric acid; of a hydroxide such as caustic soda; and to know that when nitric acid acts on caustic soda it forms water and sodium nitrate

$$NaHO + HNO_3 = H_2O + NaNO_3.$$

The reverse change is not possible in this case owing to the strong affinity; but if it were, then water and sodium nitrate would produce sodium hydroxide and nitric acid.

B. *Presentation.*—Fats and oils form a well-known class of bodies. They are generally distinguished from one another by the fact that the fats are solids and the oils liquid at ordinary temperatures. But it is well known that oils such as linseed oil and olive or salad oil are often solid in this country in winter, and cokernut oil is solid here even in summer, although liquid in the tropics, where it is produced.

The nature of a fat is best understood by noticing the change that takes place in the soap works when superheated steam is led into a vessel full of molten fat. The fat is decomposed, and combines with the elements in the steam, forming glycerine and a fatty acid. This corresponds to the reverse change imagined to take place above when water and sodium nitrate would form sodium hydroxide and nitric acid.

Glycerine, then, is a base resembling sodium hydroxide, in that it will combine with an acid and form water and a salt or fat.

Glycerine may be made to combine with nitric acid, in which case a compound known as glycerine trinitrate, or commercially as "nitro-glycerine," is formed. This is a most powerful explosive, and even when diluted with sand or earth forms a violent explosive known as "dynamite."

When the glycerine is combined with a fatty acid it forms an oil or fat. Some of the most common of these are palmitin, stearin, and olein; in these the glycerine is combined respectively with palmitic, stearic, and oleic acids.

If a strong alkali be boiled with a fat, the alkali will displace the glycerine and form a compound with the fatty acid; such a compound is called a soap. Boil a quarter of a pound of lard with a strong solution of caustic soda for two hours, allow it to cool, and add some salt solution; the soap will separate and rise to the top, from which it may be skimmed and pressed into a cake. This is sodium stearate or hard soap. Potassium stearate is soft soap. Again, if soap is dissolved in water and a little hydrochloric acid be added, the sodium will form salt or sodium chloride, and the free fatty acid will rise to the top.

Some oils have the power of absorbing oxygen from the air and becoming hard. These are known as "drying oils." They are of great use in mixing paints. Linseed oil is one of the best examples of a drying oil. Such oils would obviously be unsuitable for lubricating machinery, as they would simply harden and clog the works. Non-drying oils must be used as lubricants; olive oil is a good example of this class. Evidently such oils must not be used in painting.

C. *Formulation.*—Fats and oils may be regarded as salts or compounds of glycerine and a fatty acid.

D. *Association.*—Compare with other chemical compounds.

E. *Application.*—Prepare soap as directed. Dissolve some soap in water, and add a little calcium chloride solution. Notice the insoluble calcium stearate formed. What is the composition of the scum which is formed when you wash in hard water?

THE EDUCATIONAL MUSICAL INSTRUMENT COMPANY.

(Established 1881.)

For Lists and Designs apply to the

MANAGER,
19 Highbury Place, London, N.;
43 Estate Buildings, Huddersfield;
or 21 Argyle Crescent, Portobello, Edinburgh.

MANY THOUSANDS of Teachers, School Managers, etc., including **Thirty of H.M. Inspectors of Schools,** are using and recommending our Instruments, of which we have specimens **in every County of the British Isles.**

We pay carriage, give a month's free trial, a ten years' warranty, and **exchange free of cost** if the instrument sent is not all that is desired.

See our **45 Guinea** Prize Medal Upright Iron Grand Piano for **£21 cash,** or thirty-six payments of 14s. 2d. per month. Quite new, rich, full tone, and thoroughly durable.

CYCLES, CAMERAS, & FURNITURE
on special terms.

Dr. MACNAMARA, M.A., M.P., Assistant-Secretary to the Local Government Board, writes: "We are more than delighted with the Piano which you recently selected for and supplied to us. Any of my friends who need an instrument cannot possibly do better than place themselves entirely in your hands."

Mr. J. H. YOXALL, M.A., M.P., Gen. Sec. N.U.T., writes: "For the fourth time I have experienced, for myself or for relatives, the special value, wide selection, and expert advice which your clients gain. Each of the four Pianos has given perfect satisfaction."

Showrooms open daily. Write for our List, specifying the class preferred.

WE CAN SAVE YOU MANY POUNDS.

(Please mention this Paper.)

EDUCATIONAL BOOKSELLERS.

Largest Stock of Second-Hand

School, Classical, Mathematical, Scientific Books in London.

Keys and Translations.
BOOKS BOUGHT.

New and Second-Hand.

All Inquiries Answered

Established 1854.

J. POOLE & CO.,

104 Charing Cross Road,

& 2 Manette Street, Soho,

LONDON, W.C.

THE LAST WORD IN FRENCH BOOKS

NOT OLD-FASHIONED.
NOT NEW-FANGLED.

"They combine all the advantages of the New Method, without sacrificing anything of the Old."

Omega Press French Series.

PRACTICAL FRENCH GRAMMAR.

By W. H. FRASER, B.A., and J. SQUAIR, B.A., Professors of the Romance Department, Toronto University. With an Introduction by WILLIAM ROBERTSON, M.A., Examiner in Modern Languages for the University of Aberdeen (1901–4). Crown 8vo, 3s. 6d.

A very practical and thorough course, with composition and conversation exercises. Special help has been given in pronunciation, and the exercises deal with topics of everyday life, and make provision for regular *oral* as well as written practice.

Mr. Robertson in his Introduction says:—"I believe that a full and fair examination of this work will compel every competent judge to pronounce it the best of its kind."

This estimate has been fully justified by the success of the book in practice. Many of the leading Institutions of Great Britain and Ireland have adopted it. The following are a few of the many important schools which have introduced this book:—

Aberdeen Grammar School.
Bradford Grammar School.
Belfast, Royal Academical Institution.
Belfast, Victoria College.
Carnarvon County School.
Derby, High School.
Edinburgh, George Watson's College.
Edinburgh, Royal High School.
Edinburgh, The Ladies' College.
Glasgow, The Academy.
Greenwich, Roan School.
High Wycombe, County High School.
Horsham, Christ's Hospital.
King's College (over 2,000 pupils).
Leeds, The Yorkshire College.
Newcastle-on-Tyne, Allan's Endowed School.
Oundle School.
Oxford, Diploma Correspondence College (2,500 pupils).
Oxford, Wolsey Hall.
Pontefract, Ackworth School.
Reading High School.
St. Olave's Grammar School, Southwark.
Strand School, London.
Swansea Grammar School.
Warwick, King's High School.
Wellingboro' Grammar School.
Wolverhampton Grammar School.

In Canada the book is used in every Collegiate Institute where French is taught in the province of Ontario, and it is in use in practically all the High Schools from Ontario to the Pacific coast, besides in many schools throughout Nova Scotia, New Brunswick, etc., etc.

In the United States its success has been so general that a partial list of the Colleges and Schools using it occupies some seventeen pages of print, and this list includes:—

YALE UNIVERSITY,
CORNELL UNIVERSITY,
JOHNS HOPKINS UNIVERSITY,
CHICAGO UNIVERSITY,
LELAND UNIVERSITY, and
40 Other Universities.

PRACTICAL FRENCH COMPOSITION.

For Middle and Senior Classes. By J. E. MANSION, B.-ès-L., Royal Academical Institution, Belfast. Crown 8vo, 2s.

Compiled for use with Fraser and Squair's "Practical French Grammar," to which references are repeatedly made. Carefully graduated extracts arranged in four sections, from very easy French to the standard of University and Civil Service Examinations. Full Vocabulary.

"The pieces are extremely well chosen."—*Bookman.*

"The collection of exercises for translation included in the book is, from a practical teacher's point of view, a most useful one."—*Irish School Weekly.*

PRACTICAL FRENCH READER.

By J. F. DAVIS, D.Litt., M.A. (Lond.), Assistant Examiner in the University of London, and F. THOMAS, B.A., B.Sc., Assistant Examiner in the University of London. With full Vocabulary. Crown 8vo, 2s.

Specimens post free for published price.

SPECIAL TERMS TO SCHOOLS.

OMEGA PRESS, OXFORD.

Our Science Section.

☞ **Subscribers requiring Explanations of Difficulties in any branch of Science, or Advice upon Courses of Study, can obtain all help required by communicating with the Editor, and accompanying their query with the Coupon cut from this number.**

PHYSIOGRAPHY.

(STAGES 2 AND 3.)

DETERMINATION OF H (*continued*).—The apparatus used for determining the ratio $\frac{M}{H}$ consists essentially of a short magnetic needle supported on a needle point, or suspended by a fibre at the centre of a graduated circle and a linear scale, with its zero at the centre of the graduated circle. This apparatus is shown in Fig. 1. N is the short magnetic needle supported at the centre O of the graduated circle AB. The needle is provided with a long pointer, CD, of glass, aluminium, or other non-magnetic material. The needle is made short, so that when it is deflected its poles still remain in a magnetic field of practically the same strength. The long pointer is used, so that a large graduated circle may be employed to increase the accuracy of the readings. LR is the line or scale graduated in centimetres from the point O.

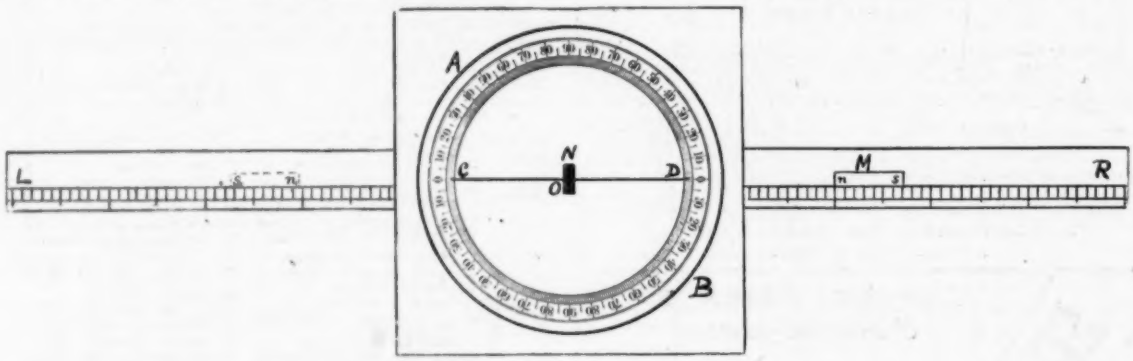


FIG. 1.

The instrument is known as the deflection magnetometer, and is used in the following way. The magnetometer is first adjusted, so that the ends C and D of the pointer come to zero on the graduated circle.

When in this position the scale LR will be in a plane at right angles to the magnetic meridian. A bar magnet, M, of from five to six centimetres in length is now placed on one of the side arms, with its centre at a convenient distance (say twenty centimetres) from O. Suppose, in the first case, that the north pole *n* of the magnet is turned towards the needle, this will deflect the needle N through a considerable angle. The positions of the ends, CD, of the pointer are read, and the readings recorded. The reason for reading both ends of the pointer is to correct for any error due to the needle not being supported exactly at the centre of the graduated circle. (See Fig. 4, p. 274, *Practical Teacher*, November 1907.)

The magnet is now turned round end for end, so that the south pole faces the needle. This causes the needle to be deflected in the opposite direction. Both ends of the needle are again read, and the readings recorded. The object of reversing the magnet and deflecting the needle in the reverse direction is to correct for any error due to the zero line of the graduated circle not being exactly at right angles to the meridian.

How this reversal accomplishes this will be evident from Fig. 2. Let pp_1 be a line accurately at right angles to the meridian, and let oo_1 be the position occupied by the zero line of the circular scale. If CD is the position taken up by the pointer, the readings O_1, D, and OC will each be greater than they should be by an amount p_1, o_1, or po. When, however, the magnet is reversed, and the pointer moves to C_1D_1, each reading will be too small by the same amount as it was too great in the first case. By taking the mean we get rid of the error.

Having taken these four readings, the magnet is next removed to the side arm L, and placed so that its centre is at the same reading (say twenty centimetres) as before. The two ends of the pointer are read, the magnet reversed end for end, and the positions of the ends of the pointer again read. The mean of the four readings gives the angle θ. The object of placing the magnet first on the arm R and then on L is to correct for the centre of the graduated circle not exactly coinciding with the centre of the linear scale LR.

Having thus obtained the angle θ, its tangent is taken from the tables. The distance from O to the centre of the magnet M is also read. This is d in the formula. Substituting these values in the formula

$$\frac{M}{H} = \tfrac{1}{2}d^3 \tan\theta,$$

we get a numerical value for $\frac{M}{H}$.

The following example from an actual experiment will make the matter quite clear:—

$$d = 20 \text{ cms.}, \quad \theta = 13{\cdot}5^\circ, \quad \tan\theta = {\cdot}2401.$$

$$\therefore \frac{M}{H} = \tfrac{1}{2} \times 20^3 \times {\cdot}2401 = 4000 \times {\cdot}2401 = 960{\cdot}4.$$

The second experiment required in determining H is to find the time of swing of the magnet M used in the above experiment. The formula which we shall employ is

$$t = 2\pi\sqrt{\frac{K}{MH}},$$

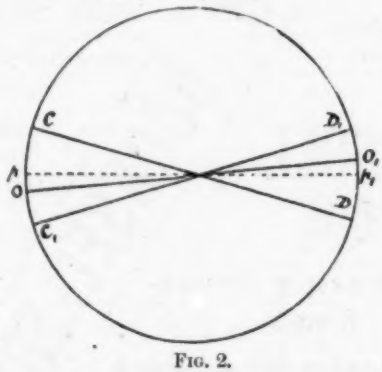


FIG. 2.

a formula very similar to that for the time of swing of a simple pendulum—

$$t = 2\pi\sqrt{\frac{l}{g}}.$$

IMPORTANT ADDITIONS to GIBSON'S New Literary Readers

Bound Limp Cloth.

PUBLISHED 6D. EACH.

No. 6. **Life of Napoleon.** Edited by OWEN ELLISON, ... 96 pages.
„ 7. **Life of Mary, Queen of Scots.** By HELEN WILLIAMS, . . 96 pages.
„ 8. **Life of Charles Dickens.** By OWEN ELLISON, ... 96 pages.
„ 9. **Life of Nelson,** . . . . 96 pages.
„ 10. **Silas Marner.** By GEORGE ELIOT. With Introduction by FRANK BANFIELD, 200 pages.
„ 11. **Idylls of the King.** By LORD TENNYSON. With Introduction by GILBERT FELL, 180 pages.
„ 12. **Cranford.** By Mrs. GASKELL, 190 pages.
„ 13. **Christmas Carol.** DICKENS, 124 pages.
„ 14. **Vicar of Wakefield.** By OLIVER GOLDSMITH, ... 190 pages.

ROBT. GIBSON & SONS (GLASGOW), Ltd.,
45 QUEEN STREET.

Now Ready.

Post 4to. i–viii + 143 pages. Net, 3s. 6d.

COMMON-SENSE NEEDLEWORK.

By MISS FLEMING,
Authoress of "How to Teach Needlework," "A Pupil Teacher's Needlework," Sewing-Class Guides, etc.

A book of Practical Needlework based on Common-sense Methods, dealing with all branches of Sewing, and especially with the *mending* of the everyday garments worn both by children and their parents, as well as of Household Linen (sheets, tablecloths, etc.).

Its aim and scope are to accentuate two somewhat overlooked, yet vital, points:—

(1) The necessity for *continued motion* in sewing, and

(2) The application of School exercises to home work; in other words, the art of *mending* or *repairing*.

"Common-sense Needlework" also contains a **Syllabus** which may be adapted to any school or class, as it includes all the needlework exercises embodied in the "Suggestions."

The following are the titles of some of the sections (in addition to those dealing with the ordinary branches of Needlework), all of which are fully illustrated:—

"Sheet Mending."
"Patching Under-garments."
"Repairing Table-Linen."
"Fastenings for Children's Clothes."
"Trimming Under-wear," etc.

E. J. ARNOLD & SON, Ltd., LEEDS & GLASGOW.

HARBUTT'S PLASTICINE

The Perfect Modelling Material in 5 Beautiful Colours.

Awarded Certificate of Merit for Purity and Excellence by the Incorporated Institute of Hygiene.

CLEAN. EVER PLASTIC.
NO WATER REQUIRED.
NO MESS, DIRT, OR TROUBLE.
ABSOLUTELY ANTISEPTIC.

Samples and Particulars Free.

THE NEW UNIVERSAL BOX.

A good supply of Plasticine in one colour, Tool, Duster, and strong grease-proof Box. Price **1s.**

Post free, **1s. 3d.**

W. HARBUTT, A.R.C.A.,
215 Bathampton, BATH.

AMBLESIDE HOLIDAY COURSE.

(ENGLISH LAKE DISTRICT.)

JULY 20th to AUGUST 28th, 1908.

WOOD AND METAL WORK (City Guilds).
EDUCATIONAL HANDWORK SCHEMES. SLOYD.
REPOUSSÉ. ENAMELLING AND ELEMENTARY JEWELLERY-MAKING. CARVING. MODELLING. DESIGN.
CUT AND EMBOSSED LEATHER. ART EMBROIDERY.
BRUSH AND BLACKBOARD DRAWING.
CARDBOARD, PAPER, AND COLOUR WORK. KINDERGARTEN. NATURE STUDY.
COOKERY. PHYSICAL CULTURE. LAUNDRY WORK. AND A SPECIAL AND COMPLETE COURSE OF HAND AND EYE TRAINING FROM INFANTS' ROOM TO STANDARD VI.
RECOGNISED CERTIFICATES OBTAINABLE.
"HOSTEL" AND PRIVATE ACCOMMODATION PROVIDED.
Particulars upon application.

JOSEPH PHILLIPS, Director,
Rothay Holme, AMBLESIDE.

THE SCHOOLMISTRESS

WEEKLY PRICE ONE PENNY. CONTAINS **HELPFUL ARTICLES ON ALL BRANCHES OF SCHOOL WORK.** WEEKLY PRICE ONE PENNY.

TEACHERS not already Subscribers should order from their Newsagent, or forward Postal Order or Halfpenny Stamps to **HOWARTH BARNES, 149 Fleet Street, London, E.C.**

SUBSCRIPTIONS (Prepaid).
ONE SHILLING AND NINEPENCE for THREE MONTHS.
THREE SHILLINGS AND THREEPENCE for SIX MONTHS.
SIX SHILLINGS for TWELVE MONTHS.
— Post Free. —

The Best Paper for Pupil Teachers and all Mistresses.
Full Notes on Certificate Literature.

TELEGRAPHIC ADDRESS: "SCHOOLMISTRESS, LONDON."

Address:
HOWARTH BARNES,
149 Fleet Street, LONDON, E.C.

In this formula M and H have the same significance as before, t is the time of a complete oscillation in seconds, and K is a quantity known as the moment of inertia. The moment of inertia of a bar magnet of rectangular section oscillating about a vertical axis passing at right angles through its centre, and at right angles to one pair of its faces, is given by the formula

$$K = \mu\left(\frac{l^2 + b^2}{12}\right),$$

where μ is the mass of the magnet in grams, and l and b its length and breadth respectively expressed in centimetres.

To find K, then, we weigh the magnet and measure its length and breadth, and substitute the figures in the formula.

The following are the figures for the magnet used in the above experiment:—

$$\mu = 61{\cdot}5 \text{ grams}, \; l = 10{\cdot}1 \text{ cms.}, \; b = 1{\cdot}28 \text{ cms.}$$

$$\therefore K = 61{\cdot}5\left(\frac{10{\cdot}1^2 + 1{\cdot}28^2}{12}\right) = 531{\cdot}194.$$

The magnet is now supported by a strong fibre inside a closed glass case: the glass case screens it from the effects of draughts. The magnet is then set oscillating about the meridian, and the time occupied by a considerable number of oscillations taken. The oscillations are counted in the following way. A mark is made on the glass vessel at a point opposite the end of the magnet when at rest. After the magnet has been set oscillating the time is noted when the end of the magnet passes this position. When the end of the magnet again passes this point going in the same direction this is called one, and a mark made on a piece of paper. When it again passes the same mark going in the same direction this is called two, and a second mark made, and so on. When the needle has made a considerable number of oscillations, and is just completing, say, the twentieth, the time is again taken. Dividing the time occupied by the number of swings gives the time of one swing.

Taking the formula

$$t = 2\pi\sqrt{\frac{K}{MH}},$$

square both sides to get rid of the square root, then

$$t^2 = 4\pi^2\frac{K}{MH},$$

$$\text{or } MH = \frac{4\pi^2 K}{t^2}.$$

In an experiment with the above magnet the time of swing was found to be 24 seconds, hence

$$MH = \frac{4 \times 3{\cdot}1416^2 \times 531{\cdot}194}{24 \times 24} = 36{\cdot}42. \quad . \quad . \quad (2)$$

From this equation (2), on dividing by equation (1), we get

$$MH \times \frac{H}{M} = \frac{36{\cdot}42}{960{\cdot}6} = {\cdot}0379,$$

$$\text{or } H^2 = {\cdot}0379.$$

$$\therefore H = {\cdot}192+.$$

We have thus, by means of combining the results of the two experiments, obtained a value for the horizontal component of the earth's magnetism.

The above experiment was carried out in an ordinary physical laboratory in London, and the result is rather high, due to the presence of iron in the building. The value of H for London is ·18, or, in other words, in London the force exerted in a horizontal direction by the earth's magnetism on a unit north magnetic pole is ·18 dynes. In our next lesson we shall see how we may use the results we have already obtained to solve various problems.

SPECIAL NOTICE.

THE Editor is making arrangements for rendering OUR SCIENCE SECTION more up-to-date and helpful to a larger number of teachers and students. While plans are being drawn up for this purpose, he would be glad to hear from any of his readers who have found the SCIENCE SECTION useful in the past, and who have suggestions to offer for its improvement.

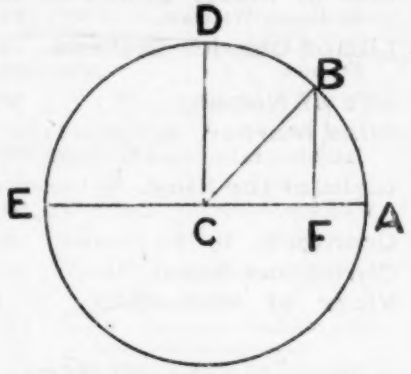
MATHEMATICS.

(STAGES 2 AND 3.)

BY FRANK CASTLE, M.I.M.E.,

Royal College of Science; Lecturer on Mathematics, etc., Morley College; Author of "Elementary Practical Physics," "Practical Mathematics," etc.

MEASUREMENT OF ANGLES.—The angle between two lines AC and CB which intersect at a point C may be measured either in *degrees* or in *radians*. What may be termed a unit angle or right angle ACD is divided into 90 equal parts, each a *degree*. A further subdivision is made by dividing a degree into 60 equal parts, each a *minute*, and a minute is similarly divided into 60 equal parts, each a *second*. An angle of 45 degrees, 30 minutes, and 20 seconds is written as 45° 30′ 20″.



RADIAN MEASURE.—The radian measure of an angle, also called the *circular measure*, is obtained by drawing an arc of a circle to intersect the two lines, using the point of intersection as a centre and any convenient length as radius. Dividing the length of arc AB by the radius AC, the quotient is the radian measure required—that is,

$$\text{radian measure} = \frac{\text{length of arc}}{\text{length of radius}}.$$

This is usually abbreviated into angle = arc ÷ radius. Unit angle will be obtained when the length of the arc is equal to the radius.

Assuming the line AC rotates until it is in the position CE, then the angle described will be two right angles or 180°. The angle is also $\pi r \div r = \pi$. Hence 180° and π denote the same angle, and unit angle is $180 \div \pi = 57°{\cdot}2956 \ldots = 57°{\cdot}3$.

Ex. 1. Find the radian measure of an angle of 45°.

$$\frac{45 \times \pi}{180} = \frac{\pi}{4} \text{ radians.}$$

Ex. 2. Find the number of degrees in an angle of 1·2 radians.

$$\frac{1{\cdot}2 \times 180}{\pi} = 68°{\cdot}76.$$

TRIGONOMETRICAL FUNCTIONS.—The angle between two lines is also measured by what are called the functions of an angle. Thus, if CFB is a right-angled triangle, the following ratios are obtained—

$$\sin C = \frac{FB}{CB}, \; \cos C = \frac{CF}{CB}, \; \tan C = \frac{BF}{CF}.$$

The reciprocals of these also form important ratios, thus

$$\text{cosec } C = \frac{CB}{FB}, \; \sec C = \frac{CB}{CF}, \; \cot C = \frac{CF}{BF}.$$

It is easily seen that

$$\sin^2 C + \cos^2 C = 1, \; \tan C = \frac{\sin C}{\cos C}, \; \sec^2 C = 1 + \tan^2 C.$$

Also the sine or cosine of an angle cannot exceed unity, the secant or cosecant cannot be less than unity, the tangent or cotangent may have any value from zero to infinity.

Ex. 3. (*a*) What is the numerical value of an angle in radian measure?

(*b*) Find the radian measure of an angle of 112° 43′; also find the length of an arc which subtends an angle of 112° 43′ at the centre of a circle whose radius is 153 feet. [Take $\pi = 3{\cdot}14159$.]

HYGIENE & PHYSIOLOGY.

Davies' Physiological Diagrams.

A set of nine 30 in. by 23 in. Diagrams, boldly drawn, and printed in black. They show very clearly the different members and organs of the body, and for school use are unequalled.
Prices:—Paper, eyeletted, and in wrapper . 5/- net per Set.
On Cloth . . . . . 12/- " "
Explanatory Handbook accompanies each Set.

Human Anatomy and Physiology.

Two Sheets of Diagrams prepared
By Sir W. TURNER,
carefully and accurately drawn and printed in colours.
Sheet No. 1 shows Bones; Ligaments; Muscles; and Heart and Arteries.
Sheet No. 2 shows Senses; Brain and Nerves; Veins and Organs of Respiration; and Organs of Digestion.
Size of each sheet 50 in. by 42 in. Price, C.R.V., 12/-.

Dental Hygiene Charts.

Size, 34½ in. by 53 in.
A series of three charts prepared by the School Dentists' Society, carefully drawn and coloured to show the importance of this subject. No. 1, Elementary; No. 2, Nerves and Caries; No. 3, Teeth of a Child.
Price mounted, 12/- per Chart, or 30/- per Set.
Reduced Chart with Letterpress given with each.

Diagrams on Hygiene.

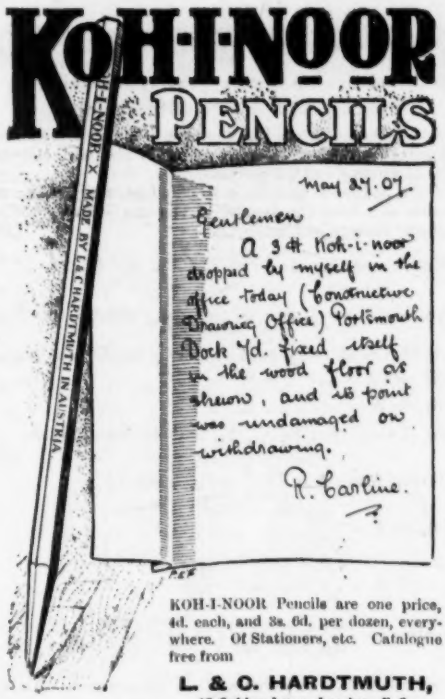
By R. J. COLLIE, M.D.

Twelve Diagrams, size 35 in. by 45 in., carefully prepared and coloured, fully illustrate a course of Health Lectures—Drainage, Ventilation, Water, Care of the Body.
In two Wall Atlases, Six Diagrams in each, at 35/- each. Each Sheet mounted and varnished at 8/- each. Handbook gratis with each Set.

All interested should send at once for full particulars of these and our other publications.

W. & A. K. JOHNSTON, Ltd.,
7 Paternoster Sq., London, E.C., and at Edinburgh.

KOH-I-NOOR PENCILS


KOH-I-NOOR
MADE BY L.&C.HARDTMUTH IN AUSTRIA
May 24. 07.
Gentlemen
A 3 H Koh-i-noor dropped by myself in the office today (Constructive Drawing Office) Portsmouth Dock Yd. fixed itself in the wood floor as shewn, and its point was undamaged on withdrawing.
R. Carline.

KOH-I-NOOR Pencils are one price, 4d. each, and 3s. 6d. per dozen, everywhere. Of Stationers, etc. Catalogue free from

L. & C. HARDTMUTH,
12 Golden Lane, London, E.C.

SPECIAL OFFER TO TEACHERS] [AS AN ADVERTISEMENT.

THE LATEST FOUNTAIN PEN, 1908 MODEL.

One of the leading manufacturers of Gold Fountain Pens challenges to demonstrate that their Pens are the very best, and have the largest Sale; that no better article can be produced.
They offer to give away 100,000 of the Half-Guinea Diamond Star Gold Fountain Pens, 1908 Model, for 2S. 6D. each. This Pen is fitted with 14-carat Solid Gold Nib, iridium pointed, making it practically everlasting, smooth, soft, and easy writing, and a pleasure to use. Twin Feed and Spiral, to regulate the flow of ink, and all the latest improvements.

The Self-Filling and Self-Cleaning Perfection Fountain Pen is a marvel of Simplicity; it deserves to be popular. It is non-leakable, fills itself in an instant, cleans itself in a moment—a press, a fill—and every part is guaranteed for two years. **The Massive 14-Carat Gold** Nib is iridium pointed and will last for years, and improves in use. Fine, medium, broad or J points can be had.
This Marvellous Self-Filling Pen, worth 15s., is offered to Teachers for 5S. 6D. Every Pen is guaranteed, and money will be returned if not fully satisfied. Any of our readers desiring a really genuine article cannot do better than write to the Makers, **The Red Lion Manufacturing Co., Ltd., 71 High Holborn, London, W.C.,** and acquire this Bargain. (Agents wanted.)

The Practical Teacher.

CHARGES FOR ADVERTISEMENTS.

	£	s.	d.
Page (Ordinary)	5	5	0
Back Page	6	6	0
Half Page	2	12	6
Quarter Page	1	7	6
One-eighth Page	0	15	0

*** *Special Terms for Series on application.*

THE PRACTICAL TEACHER is published on the 25th of each month. Advertisements should reach the Office not later than the 10th of the month.

THOMAS NELSON AND SONS, 35 and 36 Paternoster Row, London, E.C.

(*a*) Radian measure $= \frac{90\pi}{180} = 1{\cdot}570795.$

(*b*) Radian measure $= \frac{112° 43' \times \pi}{180} = 1{\cdot}96727.$

From the relation arc = angle × radius we obtain

arc $= 1{\cdot}96727 \times 153 = 301$ feet nearly.

Ex. 4. (*a*) Define the radian (or unit of circular measure).
(*b*) Find the number of degrees (with the odd minutes and seconds) in an angle of 2·5 radians.
(*c*) If the radius of a circle is 10,000 feet, find to the nearest hundredth of a foot the length of the arc, which subtends an angle of one minute at the centre. (1899.)

(*b*) Number of degrees $= \frac{2{\cdot}5 \times 180}{\pi} = 143° 14' 20''.$

(*c*) Arc = angle × radius $= \frac{\pi}{60 \times 180} \times 10000 = 2{\cdot}909$ feet.

Ex. 5. If A is an acute angle, show by means of a diagram
(i) $\sin^2 A + \cos^2 A = 1$.
(ii) $\sin A = \tan A \cos A$.
(iii) If $\cos A = \sqrt{13} \div \sqrt{17}$, find sin A and tan A. (1903.)

(ii) $\tan A \cos A = \frac{\sin A}{\cos A} \cos A = \sin A.$

(iii) $\cos A = \frac{\sqrt{13}}{\sqrt{17}}.$

$$\sin A = \sqrt{1 - \frac{13}{17}} = \frac{2}{\sqrt{17}}.$$

$$\tan A = \frac{\sin A}{\cos A} = \frac{2}{\sqrt{17}} \div \frac{\sqrt{13}}{\sqrt{17}} = \frac{2}{\sqrt{13}}.$$

Trigonometrical Identities and Equations.—An expression involving trigonometrical functions can usually be expressed in two or more different forms. Usually what is required is to show that the expression on one side of such an equation is equal to that on the other. Such manipulation ensures familiarity with the fundamental trigonometrical forms, and is therefore of great assistance to a student. In a similar manner the process of solving a trigonometrical equation is in many respects that used in the corresponding algebraical equations, θ or other symbol replacing the x or other variable in an equation.

Ex. 6. Establish the following identities:—
(*a*) $\sin^4 A + \cos^2 A = \cos^4 A + \sin^2 A.$
(*b*) $\sin^2 A \tan^2 A = \tan^2 A - \sin^2 A.$
(*c*) $\sin A \cos A = \frac{\tan A}{1 + \tan^2 A}.$
(*d*) $\frac{\cos^2 A - \sin^2 B}{\sin^2 A \sin^2 B} = \frac{1}{\tan^2 A \tan^2 B} - 1.$ (1906.)

(*a*) $\sin^4 A + \cos^2 A = \sin^2 A (1 - \cos^2 A) + \cos^2 A,$
or $\sin^2 A - \sin^2 A \cos^2 A + \cos^2 A = 1 - \sin^2 A \cos^2 A$
$= 1 - (1 - \cos^2 A) \cos^2 A = 1 - \cos^2 A + \cos^4 A$
$= \sin^2 A + \cos^4 A.$

(*b*) $\tan^2 A - \sin^2 A = \frac{\sin^2 A}{\cos^2 A} - \sin^2 A = \frac{\sin^2 A (1 - \cos^2 A)}{\cos^2 A}.$

$$\therefore \sin^2 A \times \frac{\sin^2 A}{\cos^2 A} = \sin^2 A \tan^2 A.$$

(*c*) $\frac{\tan A}{\sec^2 A} = \frac{\cos^2 A \sin A}{\cos A} = \sin A \cos A.$

(*d*) $\frac{1 - \tan^2 A \tan^2 B}{\tan^2 A \tan^2 B} = \frac{\cos^2 A \cos^2 B - \sin^2 A \sin^2 B}{\sin^2 A \sin^2 B}$
$= \frac{\cos^2 A - \sin^2 B}{\sin^2 A \sin^2 B}.$

Ex. 7. If A is an acute angle, show that
$\cos (90° - A) \cos (180° - A) \tan (180° + A)$
$= \sin (90° + A) \sin (180° - A) \tan (180° - A).$ (1906.)
$\cos (90° - A) = \sin A$, $\cos (180° - A) = -\cos A$,
$\tan (180° + A) = \tan A.$

$$\therefore \cos (90° - A) \cos (180° - A) \tan (180° + A)$$
$$= -\sin A \cos A \cdot \frac{\sin A}{\cos A} = -\sin^2 A.$$

For the right-hand side of the equation we obtain
$\sin (90° + A) = \cos A$, $\sin (180° - A) = \sin A$,
and $\tan (180° - A) = -\tan A.$
$\therefore \sin (90° + A) \sin (180° - A) \tan (180° - A)$
$= -\sin A \cos A \cdot \frac{\sin A}{\cos A} = -\sin^2 A.$

Hence the expression on the left-hand side is equal to that on the right.

Ex. 8. Find a value of θ from each of the following equations:—
(*a*) $2 \sin^2 \theta = 3 \cos \theta$, (*b*) $1 + 2 \sin^2 \theta = 2 \cos^2 \theta$. (1899.)

(*a*) $2 \sin^2 \theta = 3 \cos \theta.$
$\therefore 2(1 - \cos^2 \theta) = 3 \cos \theta.$
$2 - 2 \cos^2 \theta = 3 \cos \theta.$
$\therefore 2 \cos^2 \theta + 3 \cos \theta = 2.$
or $\cos^2 \theta + \frac{3}{2} \cos \theta + \left(\frac{3}{4}\right)^2 = 1 + \frac{9}{16} = \frac{25}{16}.$
$\therefore \cos \theta = -\frac{3 \pm 5}{4} = \frac{1}{2}$ or $-2.$

The minus value is inadmissible, hence $\theta = 60°$ or $300°$.

(*b*) $1 + 2 \sin^2 \theta = 2 \cos^2 \theta,$
or $1 + 2(1 - \cos^2 \theta) = 2 \cos^2 \theta.$
$\therefore 3 = 4 \cos^2 \theta.$
$\cos^2 \theta = \frac{3}{4},$
$\cos \theta = \frac{\sqrt{3}}{2}.$

Hence $\theta = 30°$ or $330°$.

Ex. 9. (*a*) Draw an appropriate diagram, and with reference to it find the numerical values of the sine, the cosine, and tangent of an angle of 60°.
(*b*) Taking the case in which A denotes an acute angle, show that
(i) $\sin^2 A = \frac{\tan^2 A}{1 + \tan^2 A}.$
(ii) $(\sin A \tan A + \cos A)^2 = 1 + \tan^2 A.$ (1907.)

Ex. 10. (*a*) Define a degree, a minute, and a second of angle. Explain what is meant by the number commonly denoted by π, and write down its approximate value true to four decimal places.
(*b*) If an angle of 90° is replaced by $\frac{\pi}{5}$, find the number of degrees, minutes, and seconds in the unit of angle. By what name is that unit commonly called? (1907.)

Ex. 11. (*a*) Construct the positive angle less than 180° whose tangent is $-\frac{3}{4}$, and find the sine and cosine of the angle correct to two places of decimals.
(*b*) Establish the following relations in which A denotes an acute angle.
(i) $\cos (180° - A) \tan (180° - A) = \sin A.$
(ii) $\sin (90° + A) \cos (90° + A) + \sin (90° - A) \cos (90° - A) = 0.$
(*c*) Taking the tangent of 31° as 0·6, how many degrees are there in each of the positive angles (less than 360°) whose tangent is $-0{\cdot}6$? (1907.)

Ex. 12. (*a*) Draw an appropriate diagram, and with reference to it define the sine, tangent, cosine, and cotangent of an angle less than 90°.
(*b*) Express the sine, the cosine, and the cotangent of an angle in terms of its tangent.
(*c*) Show that $\sin \theta \tan \theta$ is greater than $2(1 - \cos \theta)$ when θ is a positive angle less than 90°. (1907.)

Ex. 13. Find a value of θ which satisfies the equation

$$\sin \theta + 2 \cos \pi + 4 \tan \frac{\pi}{4} = 1.$$

Ans. $\theta = 270°$.

Ex. 14. If $\cos 41° 24' 34{\cdot}6'' = \frac{3}{4}$, find an angle θ which satisfies the equation $4 \cos 2\theta + 3 = 0$. Ans. $\theta = 69° 17' 42{\cdot}7''$.

Ex. 15. Find a value of θ from the equation

$$\tan \theta + \sec \theta = \sqrt{3}.$$ Ans. 30°.

BRITISH MUSEUM 28 AP 08

WRITE FOR LISTS NOW.

I SAVE YOU POUNDS

Not pence—not shillings—but POUNDS, and you can select any bike you like.
I supply on easy terms of payment—SWIFT, COVENTRY-CHALLENGE, HUMBER, ROVER, PROGRESS, PREMIER, TRIUMPH, CENTAUR, and SINGER Cycles, at pounds below the Makers' and local Agents' prices. RUDGE-WHITWORTHS from £3 15s. cash. Machines sent on approval.

A HIGH-GRADE COVENTRY MADE CYCLE, £3 12s. Cash, or 5s. Monthly.

Edwd O'Brien, Ltd

THE WORLD'S LARGEST CYCLE DEALER, (Dept. 149), COVENTRY.

12 Years' Guarantee

DELICIOUS COFFEE

RED WHITE & BLUE

FOR BREAKFAST & AFTER DINNER.

In making, use less quantity, it being so much stronger than ordinary COFFEE.

"ALLIANCE FRANÇAISE."

FRENCH HOLIDAY COURSES

BY THE SEASIDE.

At VILLERVILLE, near TROUVILLE (Normandy), August 1908—10th Year.

Phonetics taught by Symbols. General Preparation Class for the London B.A., 1908.

Syllabus post free on application to

Prof. L. BASCAN, Rambouillet.

Founded 1894. *Incorporated 1906.*

WOLSEY HALL, OXFORD.

Diploma Correspondence College, Ltd.

LARGEST AND MOST SUCCESSFUL CORR. COLL.

POSTAL TUITION

BY STAFF OF 42 GRADUATES (ALL HONOURS SPECIALISTS) FOR

LONDON MATRIC.
INTER. & FINAL
B.A., B.Sc., B.D.,
M.A., B.Sc. (Econ.)
PASS & HONOURS.

FREE GUIDES

To any of above Exams, List of Books recommended, and all particulars from the

MANAGER, WOLSEY HALL, OXFORD.

Nelson's Pictures of the Empire.

Each Sheet beautifully printed in Colours, 28 in. by 21 in. PRICES—Unmounted, 1s. each net; with metal mounts at top and bottom, 1s. 6d. net; mounted on thick cards, eyeletted, and varnished, 2s. net; mounted on linen, with wooden rollers and varnished, 2s. 6d. net.

T. NELSON & SONS, London, Edinburgh, Dublin, & New York.

NOW READY.

PREPARATORY MATHEMATICS.

By A. CLEMENT JONES, M.A., Ph.D., and C. H. BLOMFIELD, M.A., B.Sc.,

Mathematical Masters in Bradford Grammar School.

With or without Answers. Price 1s. 6d.

This book has been prepared for Junior Forms in Secondary Schools and Upper Standards in Primary Schools. It provides a complete course in Elementary Number Work preparatory to the study of more formal Mathematics. Each example appeals to youthful interests, and is of a practical and interesting character. There are numerous oral examples, and the volume not only treats of elementary arithmetic, but also provides an introduction to algebra and practical geometry.

T. NELSON & SONS,

35 and 36 Paternoster Row, London, E.C.; Edinburgh, Dublin, and New York.

NELSON'S ROYAL COPY BOOKS

For Simultaneous Instruction in Writing. A Clear and Rapid Commercial Hand. Slope and Style of Civil Service Writing. With Cut Headlines. 26 Numbers. Price 2d. each.

ROYAL STAR COPY BOOKS

In response to requests from teachers who have not time for simultaneous class-teaching of writing, but who wish to introduce the style of penmanship of the Royal Copy Books, the Publishers have issued the "Royal Star Copy Books," with two Headlines on each page.

10 Numbers. Price 2d. each.

ROYAL UPRIGHT COPY BOOKS

For Simultaneous Instruction in Writing. Perfectly upright, truly vertical.
10 Numbers. Price 2d. each.

ROYAL PENNY COPY BOOKS

Civil Service Style. 12 Numbers. Price 1d. each.

THE ROYAL WRITING BOOKS

Intended for School or Home Use, and chiefly for Pencil Work.
6 Numbers. Price 1d. each.

ROYAL STAR WRITING BOOKS

For School or Home Use, and chiefly for Pencil Work.
7 Numbers. Price 1d. each.

Nelson's School Circular and Educational Catalogue post free on application.

THOMAS NELSON AND SONS, London,
Edinburgh, Dublin, and New York.

7D Net.

NELSON'S LIBRARY

7D Net.

Issued 1st and 3rd Wednesday of each month.

6/- Novels for Sevenpence

The best modern novels—by the authors you know and like—well printed on good paper—illustrated—beautifully bound—and costing sevenpence each. That's the whole story about **NELSON'S 7D. LIBRARY.**

The size of the books is 6¼in. by 4in.—large enough for the shelf, small enough for the pocket. The type is large and legible; the binding is good red cloth, in gilt; the illustrations are excellent. And Nelson's Library contains only novels that are worth reading—the classics of to morrow.

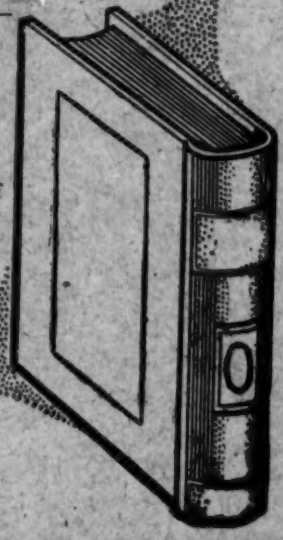
NELSON'S 7D LIBRARY

Spend sevenpence to-day on one of those mentioned below, and ask your bookseller for a prospectus of the series.

Newest Volumes:

"THE RECIPE FOR DIAMONDS."
By Cutcliffe Hyne.

"WOODSIDE FARM."
Mrs. W. K. Clifford.



7D Net.

NELSON'S LIBRARY

7D Net.

Many of the volumes have been thoroughly revised by a staff of competent revisers, and new features have been added.

BADDELEY'S GUIDES

("Thorough" Guide Series), Now Published by

THOMAS NELSON & SONS

With Coloured Maps, Index Maps, Plans, Hotels, Tours, Etc. Bound in Limp Red Cloth. All at Net Prices.

I. **SCOTLAND, Part I.** "The Highlands" as far as Aberdeen, Inverness, and Stornoway, and including Edinburgh and Glasgow. **6s. 6d.** (Revised Edition.)

II. **SCOTLAND, Part II.** "Northern Highlands" from Aberdeen, Inverness, and Gairloch to Cape Wrath and "John o' Groat's." **3s. 6d.**

III. **SCOTLAND, Part III.** "The Lowlands," including Edinburgh and Glasgow. **4s.** (Revised Edition.)

IV. **ORKNEY and SHETLAND. 1s. 6d.** (Revised Edition.)

V. **IRELAND, Part I.** Northern Division, including Dublin. **4s.**

VI. **IRELAND, Part II.** Southern Division, including Dublin. **5s.**

VII. **ENGLISH LAKE DISTRICT. 5s.**

VIII. **YORKSHIRE, Part I.** East. **2s. 6d.**

IX. **YORKSHIRE, Part II.** West. **3s.** (The two in one Vol., **5s.**)

X. **THE PEAK DISTRICT OF DERBYSHIRE, Etc. 3s.** (Revised Edition.)

XI. **NORTH WALES, Part I.** Chester, Rhyl, Llandudno, Bangor, Llanrwst, Bettws-y-Coed, Carnarvon, Llanberis, Beddgelert, Ffestiniog Sections and Pwllheli. **3s.**

XII. **NORTH WALES, Part II.** Llangollen, Bala, Dolgelley, Barmouth, Shrewsbury, Machynlleth, Aberystwyth Sections. **2s. 6d.** (The two in one Vol., **5s.**)

XIII. **SOUTH WALES** and the Wye District of Monmouthshire. **3s. 6d.** (Revised Edition.)

XIV. **THE EASTERN COUNTIES** (Watering Places, Cathedral Cities, Etc.). **3s. 6d.**

XV. **SURREY and SUSSEX,** including Tunbridge Wells. **3s. 6d.**

XVI. **ISLE OF WIGHT. 2s. 6d.**

XVII. **NORTH DEVON & NORTH CORNWALL,** with a full description of Exmoor and the Scilly Isles. **3s. 6d.**

XVIII. **SOUTH DEVON & SOUTH CORNWALL,** with a full description of Dartmoor and the Scilly Isles. **4s.** (Revised Edition.)

XIX. **BATH and BRISTOL** and 40 miles round. **5s.** (Revised Edition.)

NEW VOLUME.

XX. **SOUTH HAMPSHIRE and SOUTH DORSET,** including the New Forest. This completes Baddeley's Guides to the South Coast of England. **3s. 6d.** [*In Preparation.*

PRICE 6D NET

NELSON'S GUIDES

PRICE 6D NET

A New Series of Cheap Guide-Books to the Chief Holiday Resorts of England & Wales.

The volumes contain an average of 60 pages of letterpress, a large map of the district in three colours, several smaller maps and plans, and a number of fine illustrations. The type is large, and has been specially chosen for its clearness, since the Publishers feel that the typography of many cheap guide-books is unnecessarily trying to the eyes. The volumes are bound in strong art linen, with an attractive cover design.

I. **BRIGHTON, HOVE, & WORTHING.**

II. **HASTINGS to BEXHILL** (including Battle, St. Leonards, and Rye).

III. **PLYMOUTH and DEVONPORT.**

IV. **FALMOUTH and the LIZARD.**

V. **SIDMOUTH to TORQUAY** (including Exeter, Dawlish, and Teignmouth).

VI. **ILFRACOMBE, LYNTON, and LYNMOUTH.**

VII. **SCARBOROUGH, BRIDLINGTON, & WHITBY.**

VIII. **YORK.**

IX. **LLANDUDNO** and the Coast.

X. **BETTWS-Y-COED and SNOWDON.**

XI. **The WYE VALLEY.**

XII. **ABERYSTWYTH** and Neighbourhood.

XIII. **PARIS.** (Price **9d.** net.)

Nelson's GUIDE TO LONDON, in French. 1s. net.

THOMAS NELSON & SONS, 35 & 36 Paternoster Row, London, E.C.;
EDINBURGH, DUBLIN, & NEW YORK.

Printed and Published by Thomas Nelson & Sons, Proprietors, at the Office of "The Practical Teacher," 35 & 36 Paternoster Row, London, E.C.

COUPON
PRACTICAL TEACHER
May 1906